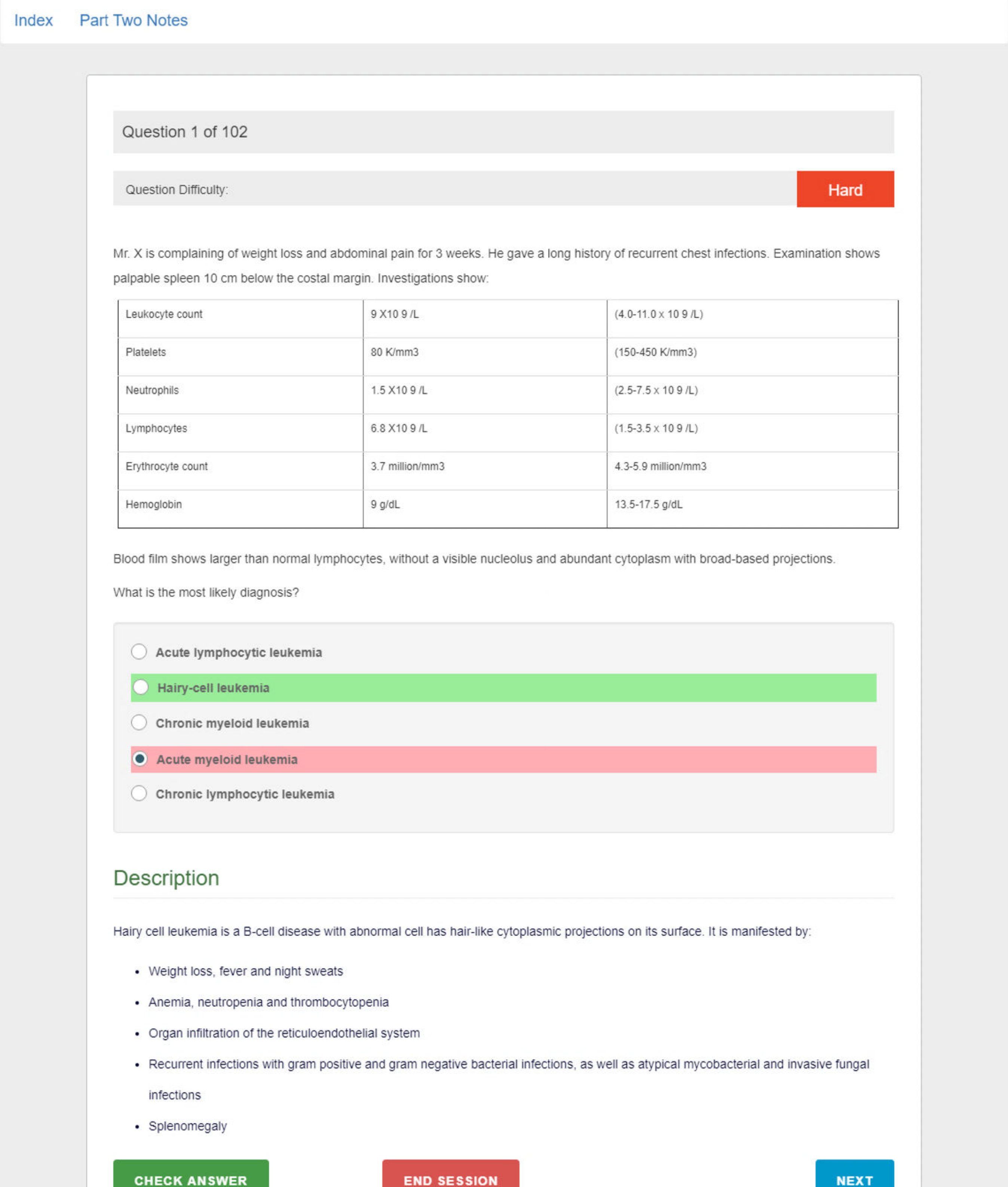


Question 1 of 102

Question Difficulty: Hard

Mr. X is complaining of weight loss and abdominal pain for 3 weeks. He gave a long history of recurrent chest infections. Examination shows palpable spleen 10 cm below the costal margin. Investigations show:

Leukocyte count	9 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	80 K/mm3	(150-450 K/mm3)
Neutrophils	1.5 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	6.8 X10 9 /L	(1.5-3.5 x 10 9 /L)
Erythrocyte count	3.7 million/mm3	4.3-5.9 million/mm3
Hemoglobin	9 g/dL	13.5-17.5 g/dL

Blood film shows larger than normal lymphocytes, without a visible nucleolus and abundant cytoplasm with broad-based projections.

What is the most likely diagnosis?

○ **Acute lymphocytic leukemia**

○ **Hairy-cell leukemia**

○ **Chronic myeloid leukemia**

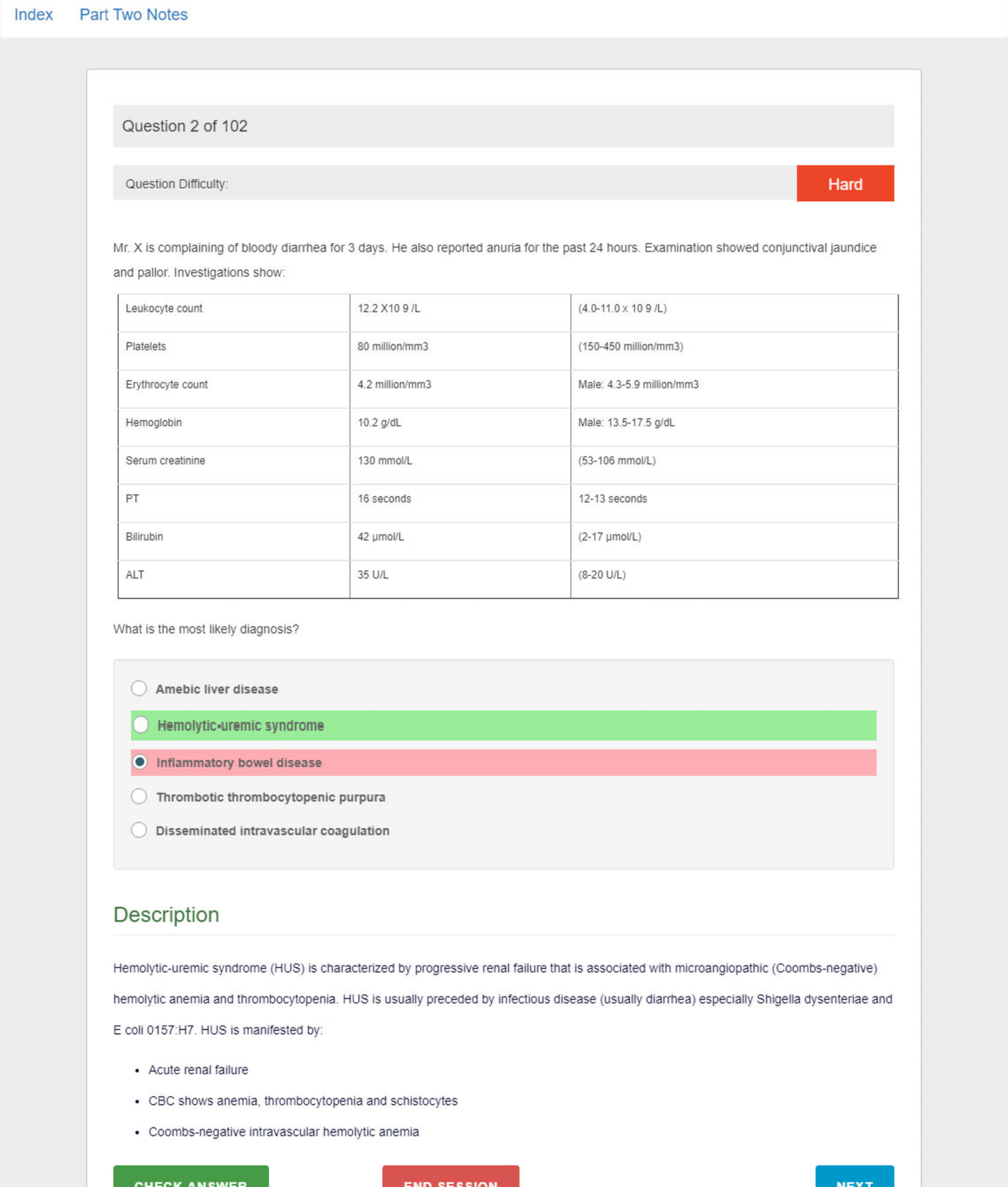
● **Acute myeloid leukemia**

○ **Chronic lymphocytic leukemia**

Description

Hairy cell leukemia is a B-cell disease with abnormal cell has hair-like cytoplasmic projections on its surface. It is manifested by:

- Weight loss, fever and night sweats
- Anemia, neutropenia and thrombocytopenia
- Organ infiltration of the reticuloendothelial system
- Recurrent infections with gram positive and gram negative bacterial infections, as well as atypical mycobacterial and invasive fungal infections
- Splenomegaly



Question 2 of 102

Question Difficulty: Hard

Mr. X is complaining of bloody diarrhea for 3 days. He also reported anuria for the past 24 hours. Examination showed conjunctival jaundice and pallor. Investigations show:

Leukocyte count	12.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	80 million/mm3	(150-450 million/mm3)
Erythrocyte count	4.2 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	10.2 g/dL	Male: 13.5-17.5 g/dL
Serum creatinine	130 mmol/L	(53-106 mmol/L)
PT	16 seconds	12-13 seconds
Bilirubin	42 µmol/L	(2-17 µmol/L)
ALT	35 U/L	(8-20 U/L)

What is the most likely diagnosis?

○ **Amebic liver disease**

○ **Hemolytic-uremic syndrome**

● **Inflammatory bowel disease**

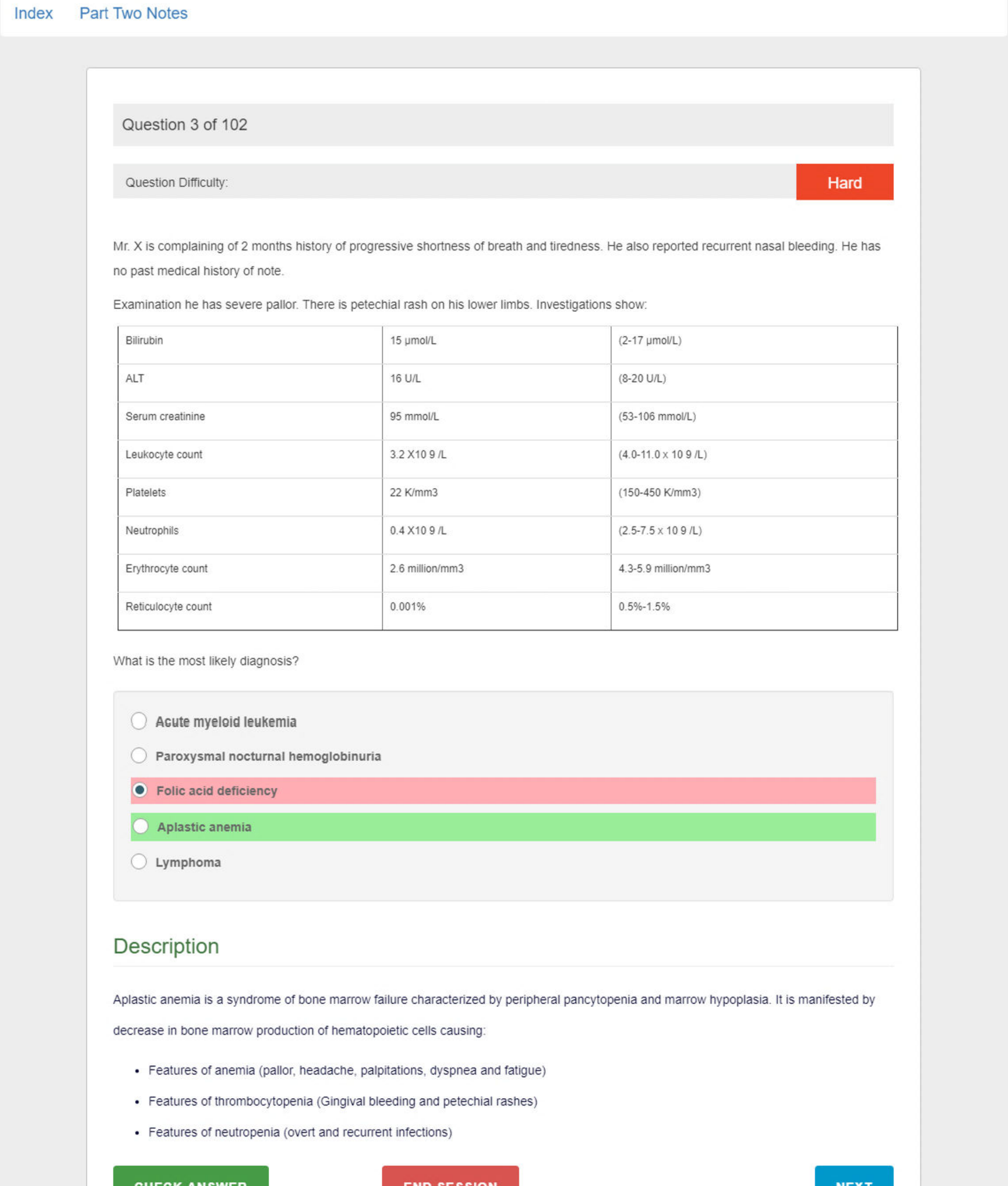
○ **Thrombotic thrombocytopenic purpura**

○ **Disseminated intravascular coagulation**

Description

Hemolytic-uremic syndrome (HUS) is characterized by progressive renal failure that is associated with microangiopathic (Coombs-negative) hemolytic anemia and thrombocytopenia. HUS is usually preceded by infectious disease (usually diarrhea) especially Shigella dysenteriae and E coli 0157:H7. HUS is manifested by:

- Acute renal failure
- CBC shows anemia, thrombocytopenia and schistocytes
- Coombs-negative intravascular hemolytic anemia



Question 3 of 102

Question Difficulty: **Hard**

Mr. X is complaining of 2 months history of progressive shortness of breath and tiredness. He also reported recurrent nasal bleeding. He has no past medical history of note.

Examination he has severe pallor. There is petechial rash on his lower limbs. Investigations show:

Bilirubin	15 μmol/L	(2-17 μmol/L)
ALT	16 U/L	(8-20 U/L)
Serum creatinine	95 mmol/L	(53-106 mmol/L)
Leukocyte count	3.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	22 K/mm3	(150-450 K/mm3)
Neutrophils	0.4 X10 9 /L	(2.5-7.5 x 10 9 /L)
Erythrocyte count	2.6 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	0.001%	0.5%-1.5%

What is the most likely diagnosis?

○ **Acute myeloid leukemia**

○ **Paroxysmal nocturnal hemoglobinuria**

● **Folic acid deficiency**

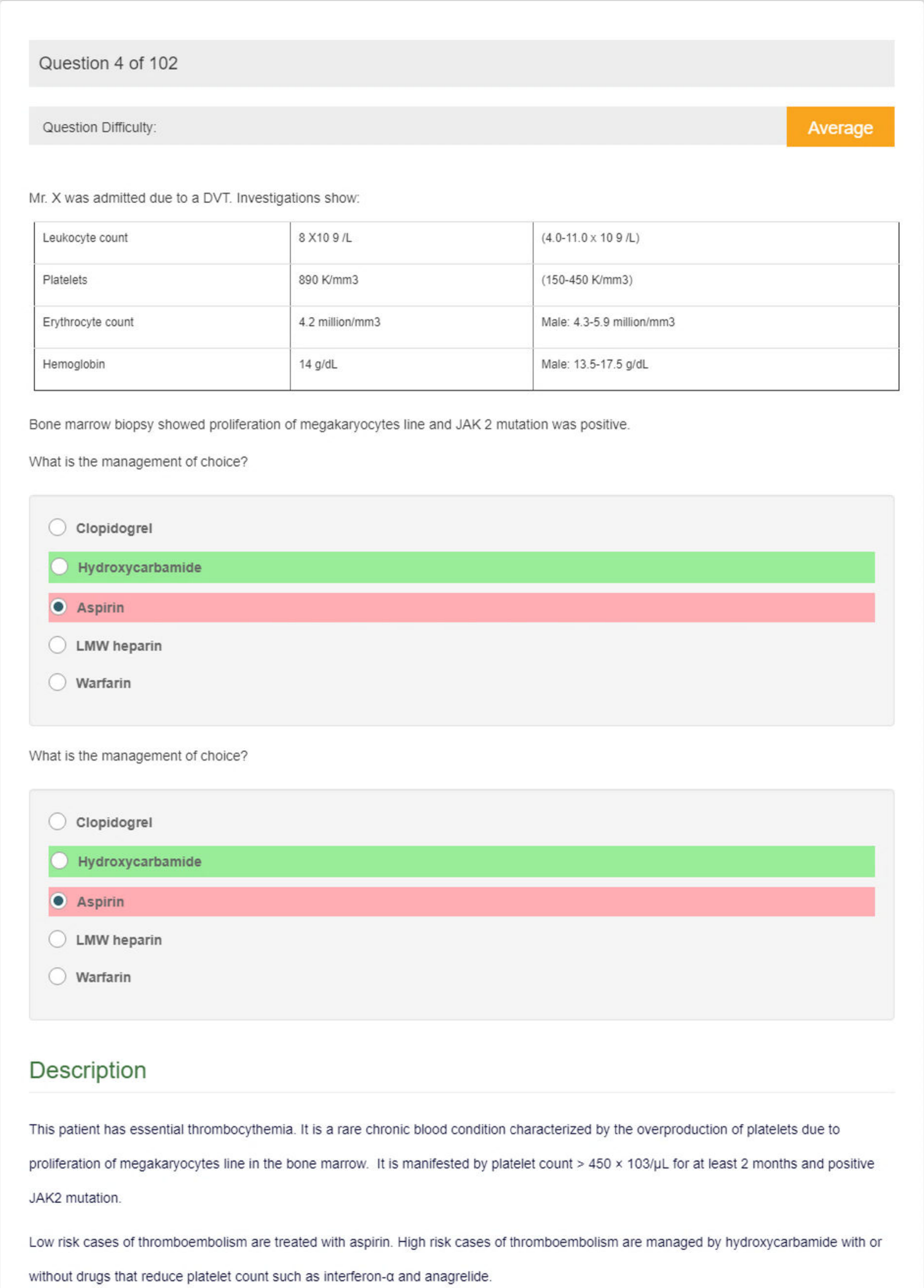
○ **Aplastic anemia**

○ **Lymphoma**

Description

Aplastic anemia is a syndrome of bone marrow failure characterized by peripheral pancytopenia and marrow hypoplasia. It is manifested by decrease in bone marrow production of hematopoietic cells causing:

- Features of anemia (pallor, headache, palpitations, dyspnea and fatigue)
- Features of thrombocytopenia (Gingival bleeding and petechial rashes)
- Features of neutropenia (overt and recurrent infections)



Question 4 of 102

Question Difficulty: **Average**

Mr. X was admitted due to a DVT. Investigations show:

Leukocyte count	8 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	890 K/mm3	(150-450 K/mm3)
Erythrocyte count	4.2 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	14 g/dL	Male: 13.5-17.5 g/dL

Bone marrow biopsy showed proliferation of megakaryocytes line and JAK 2 mutation was positive.

What is the management of choice?

○ **Clopidogrel**

○ **Hydroxycarbamide**

● **Aspirin**

○ **LMW heparin**

○ **Warfarin**

What is the management of choice?

○ **Clopidogrel**

○ **Hydroxycarbamide**

● **Aspirin**

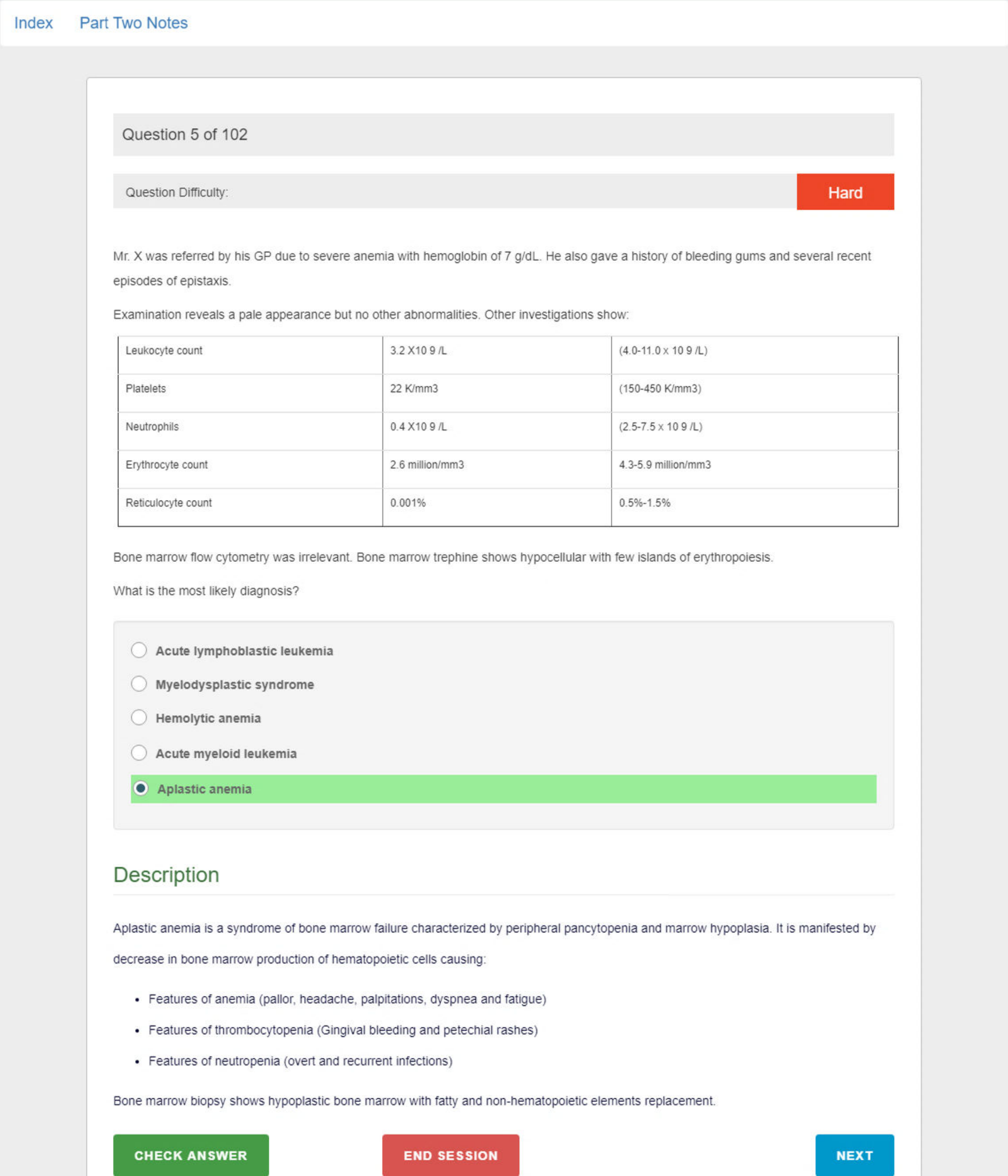
○ **LMW heparin**

○ **Warfarin**

Description

This patient has essential thrombocythemia. It is a rare chronic blood condition characterized by the overproduction of platelets due to proliferation of megakaryocytes line in the bone marrow. It is manifested by platelet count > 450 × 103/µL for at least 2 months and positive JAK2 mutation.

Low risk cases of thromboembolism are treated with aspirin. High risk cases of thromboembolism are managed by hydroxycarbamide with or without drugs that reduce platelet count such as interferon-α and anagrelide.



Question 5 of 102

Question Difficulty: **Hard**

Mr. X was referred by his GP due to severe anemia with hemoglobin of 7 g/dL. He also gave a history of bleeding gums and several recent episodes of epistaxis.

Examination reveals a pale appearance but no other abnormalities. Other investigations show:

Leukocyte count	3.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	22 K/mm3	(150-450 K/mm3)
Neutrophils	0.4 X10 9 /L	(2.5-7.5 x 10 9 /L)
Erythrocyte count	2.6 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	0.001%	0.5%-1.5%

Bone marrow flow cytometry was irrelevant. Bone marrow trephine shows hypocellular with few islands of erythropoiesis.

What is the most likely diagnosis?

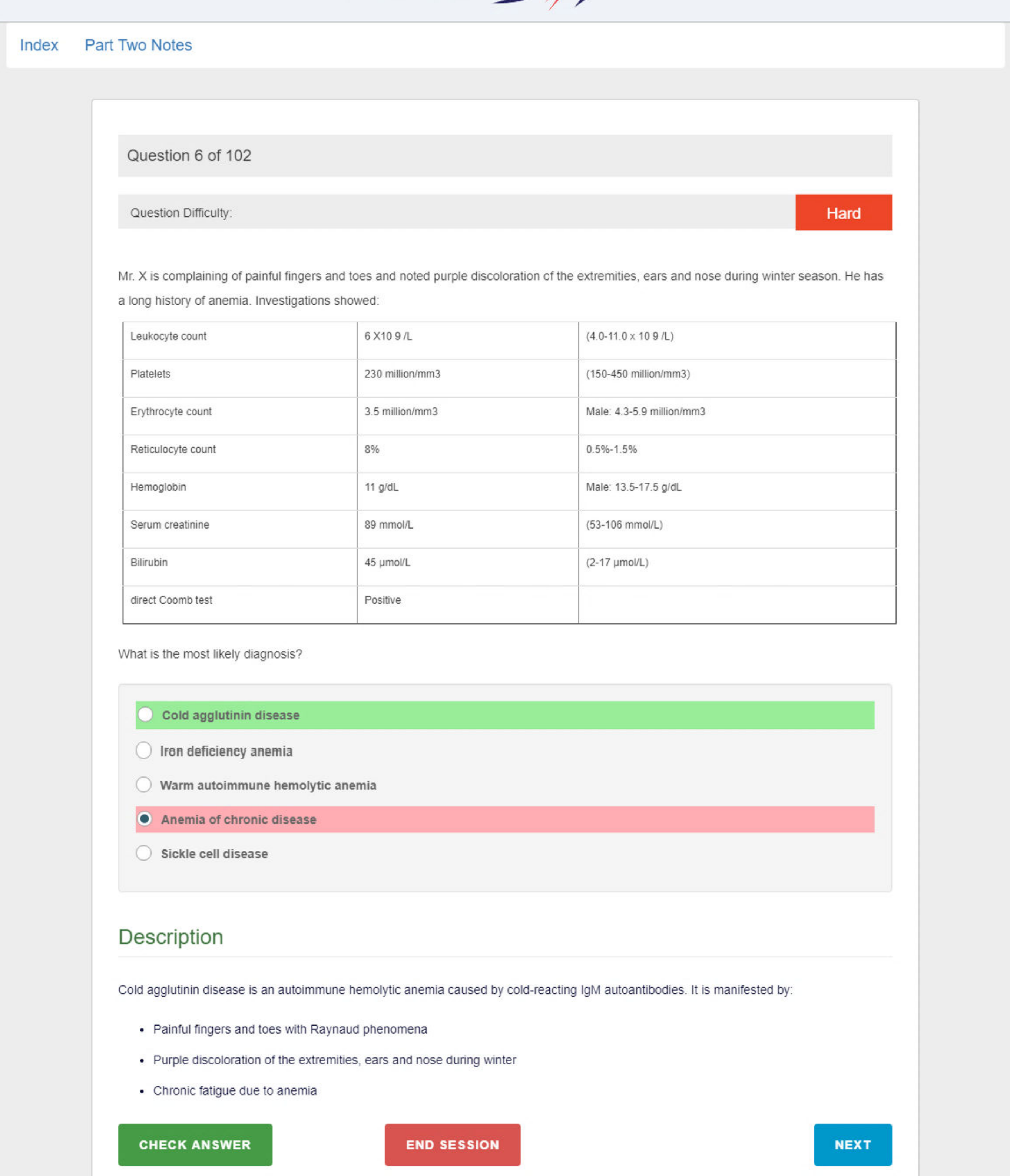
○ **Acute lymphoblastic leukemia**
○ **Myelodysplastic syndrome**
○ **Hemolytic anemia**
○ **Acute myeloid leukemia**
● **Aplastic anemia**

Description

Aplastic anemia is a syndrome of bone marrow failure characterized by peripheral pancytopenia and marrow hypoplasia. It is manifested by decrease in bone marrow production of hematopoietic cells causing:

- Features of anemia (pallor, headache, palpitations, dyspnea and fatigue)
- Features of thrombocytopenia (Gingival bleeding and petechial rashes)
- Features of neutropenia (overt and recurrent infections)

Bone marrow biopsy shows hypoplastic bone marrow with fatty and non-hematopoietic elements replacement.



Question 6 of 102

Question Difficulty: **Hard**

Mr. X is complaining of painful fingers and toes and noted purple discoloration of the extremities, ears and nose during winter season. He has a long history of anemia. Investigations showed:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	230 million/mm3	(150-450 million/mm3)
Erythrocyte count	3.5 million/mm3	Male: 4.3-5.9 million/mm3
Reticulocyte count	8%	0.5%-1.5%
Hemoglobin	11 g/dL	Male: 13.5-17.5 g/dL
Serum creatinine	89 mmol/L	(53-106 mmol/L)
Bilirubin	45 µmol/L	(2-17 µmol/L)
direct Coomb test	Positive	

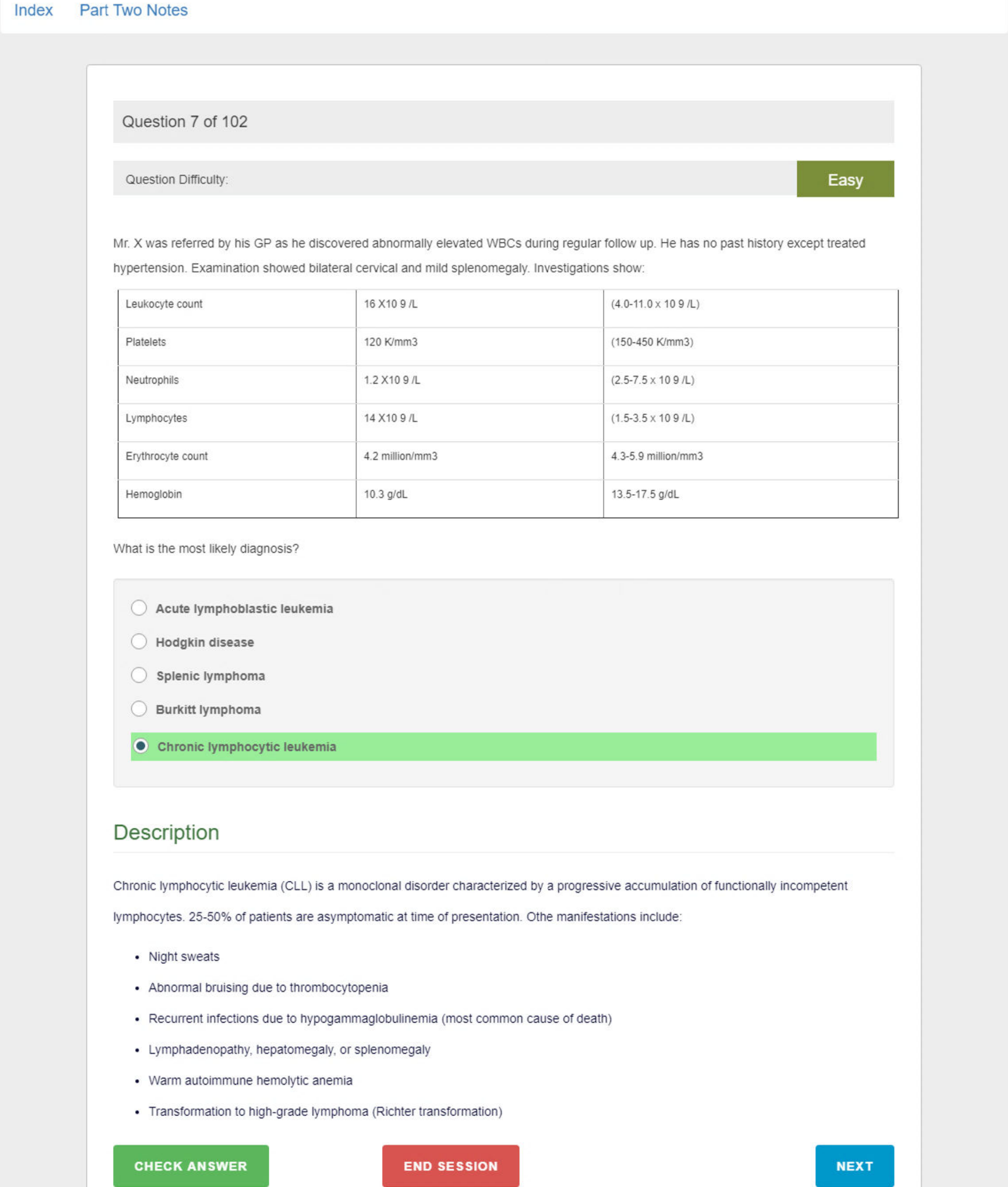
What is the most likely diagnosis?

○ **Cold agglutinin disease**
○ **Iron deficiency anemia**
○ **Warm autoimmune hemolytic anemia**
● **Anemia of chronic disease**
○ **Sickle cell disease**

Description

Cold agglutinin disease is an autoimmune hemolytic anemia caused by cold-reacting IgM autoantibodies. It is manifested by:

- Painful fingers and toes with Raynaud phenomena
- Purple discoloration of the extremities, ears and nose during winter
- Chronic fatigue due to anemia



Question 7 of 102

Question Difficulty: Easy

Mr. X was referred by his GP as he discovered abnormally elevated WBCs during regular follow up. He has no past history except treated hypertension. Examination showed bilateral cervical and mild splenomegaly. Investigations show:

Leukocyte count	16 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	120 K/mm3	(150-450 K/mm3)
Neutrophils	1.2 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	14 X10 9 /L	(1.5-3.5 x 10 9 /L)
Erythrocyte count	4.2 million/mm3	4.3-5.9 million/mm3
Hemoglobin	10.3 g/dL	13.5-17.5 g/dL

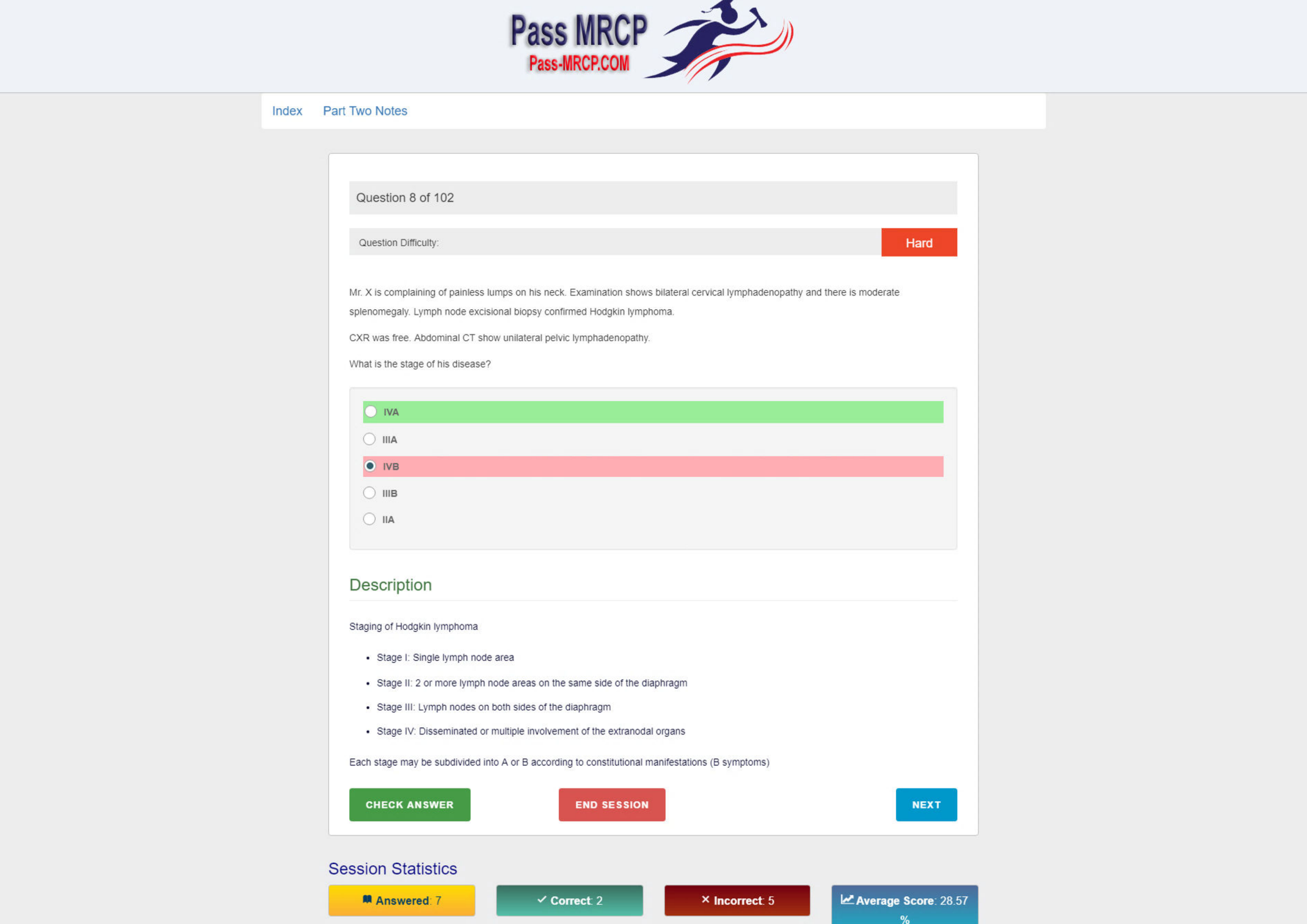
What is the most likely diagnosis?

○ **Acute lymphoblastic leukemia**
○ **Hodgkin disease**
○ **Splenic lymphoma**
○ **Burkitt lymphoma**
● **Chronic lymphocytic leukemia**

Description

Chronic lymphocytic leukemia (CLL) is a monoclonal disorder characterized by a progressive accumulation of functionally incompetent lymphocytes. 25-50% of patients are asymptomatic at time of presentation. Othe manifestations include:

- Night sweats
- Abnormal bruising due to thrombocytopenia
- Recurrent infections due to hypogammaglobulinemia (most common cause of death)
- Lymphadenopathy, hepatomegaly, or splenomegaly
- Warm autoimmune hemolytic anemia
- Transformation to high-grade lymphoma (Richter transformation)



Question 8 of 102

Question Difficulty: Hard

Mr. X is complaining of painless lumps on his neck. Examination shows bilateral cervical lymphadenopathy and there is moderate splenomegaly. Lymph node excisional biopsy confirmed Hodgkin lymphoma.

CXR was free. Abdominal CT show unilateral pelvic lymphadenopathy.

What is the stage of his disease?

○ IVA
○ IIIA
● IVB
○ IIIB
○ IIA

Description

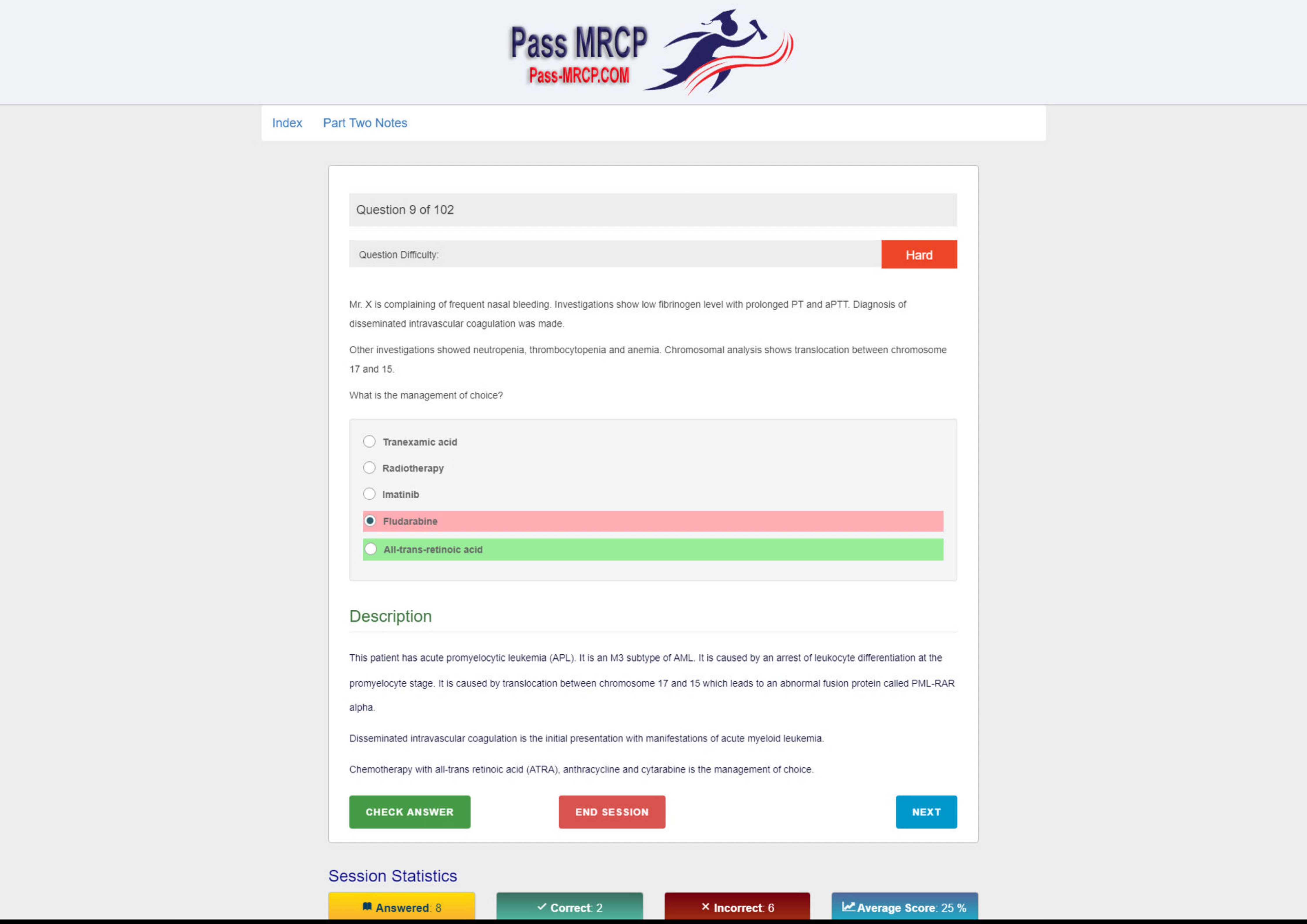
Staging of Hodgkin lymphoma

- Stage I: Single lymph node area
- Stage II: 2 or more lymph node areas on the same side of the diaphragm
- Stage III: Lymph nodes on both sides of the diaphragm
- Stage IV: Disseminated or multiple involvement of the extranodal organs

Each stage may be subdivided into A or B according to constitutional manifestations (B symptoms)

Session Statistics

Answered: 7
✓ Correct: 2
✕ Incorrect: 5
Average Score: 28.57 %



Question 9 of 102

Question Difficulty: **Hard**

Mr. X is complaining of frequent nasal bleeding. Investigations show low fibrinogen level with prolonged PT and aPTT. Diagnosis of disseminated intravascular coagulation was made.

Other investigations showed neutropenia, thrombocytopenia and anemia. Chromosomal analysis shows translocation between chromosome 17 and 15.

What is the management of choice?

- ○ **Tranexamic acid**
- ○ **Radiotherapy**
- ○ **Imatinib**
- ● **Fludarabine**
- ○ **All-trans-retinoic acid**

Description

This patient has acute promyelocytic leukemia (APL). It is an M3 subtype of AML. It is caused by an arrest of leukocyte differentiation at the promyelocyte stage. It is caused by translocation between chromosome 17 and 15 which leads to an abnormal fusion protein called PML-RAR alpha.

Disseminated intravascular coagulation is the initial presentation with manifestations of acute myeloid leukemia.

Chemotherapy with all-trans retinoic acid (ATRA), anthracycline and cytarabine is the management of choice.

Session Statistics

Answered: 8
✓ **Correct**: 2
× **Incorrect**: 6
Average Score: 25 %

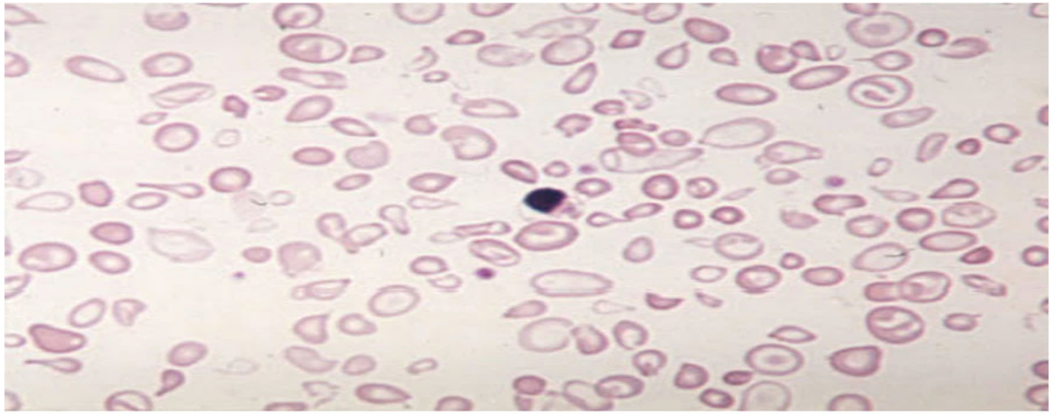
Question 10 of 102

Question Difficulty: **Easy**

1.5 years old infant developed severe pallor and tachycardia for the past 10 months. His investigations show:

Erythrocyte count	2.9 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	6 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	60 fl	80-100 fl
Mean corpuscular hemoglobin	14 pg/cell	25.4-34.6 pg/cell
Serum ferritin	220 µg/L	Male 20-250 µg/L

His blood film is shown in the image.



What is the most likely diagnosis?

- ○ **Anemia of chronic disease**
- ○ **Iron-deficiency anemia**
- ○ **Sickle-cell anemia**
- ○ **Beta thalassemia major**
- ● **Beta thalassemia trait**

Description

Beta thalassemia is caused by a genetic deficiency in the synthesis of beta-globin chains. Beta thalassemia major occurs in the homozygous state causing severe, transfusion-dependent anemia.

Peripheral blood smear shows severe microcytic and hypochromic anemia with target cells, Heinz bodies and anisopoikilocytosis.

Question 11 of 102

Question Difficulty: **Average**

Mr. X is complaining of lethargy, headache and visual disturbance. Examination revealed axillary lymphadenopathy and splenomegaly. Serum protein electrophoresis showed:

IgG	12 g/L	(6.5-15 g/L)
IgM	32 g/L	(0.4-3.45 g/L)
IgA	1.5 g/L	(0.76-3.90 g/L)

Other investigations show elevated serum creatinine.

What is the management of choice?

- ● **Hemodialysis**
- ○ **Carry out a CT brain scan**
- ○ **Plasmapheresis**
- ○ **IV fresh frozen plasma**
- ○ **Urgent ophthalmology referral**

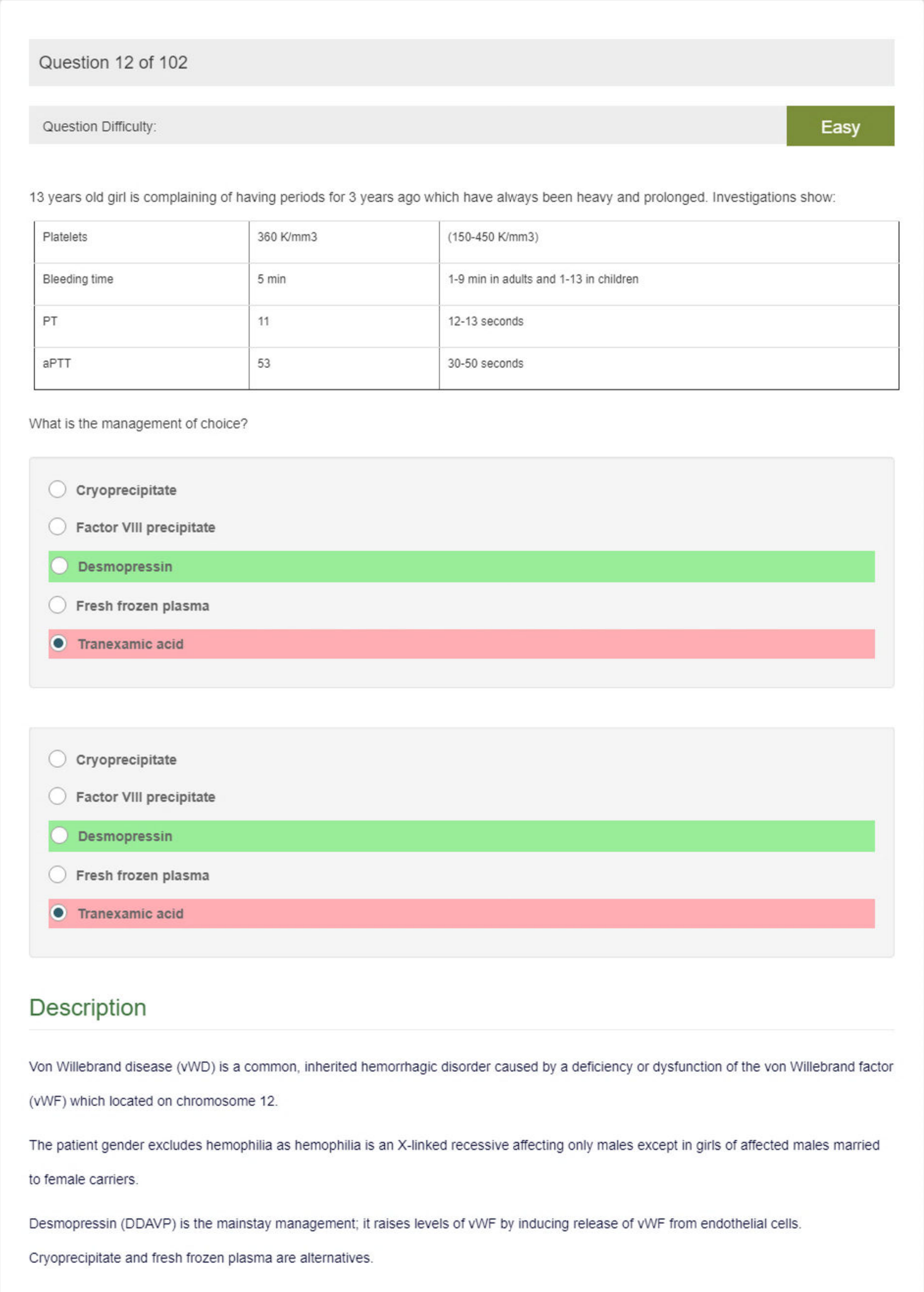
What is the management of choice?

- ● **Hemodialysis**
- ○ **Carry out a CT brain scan**
- ○ **Plasmapheresis**
- ○ **IV fresh frozen plasma**
- ○ **Urgent ophthalmology referral**

Description

This patient is complaining of hyperviscosity syndrome due to Waldenstrom macroglobulinemia. Plasmapheresis is the management of choice for hyperviscosity

CHECK ANSWER END SESSION NEXT



Question 12 of 102

13 years old girl is complaining of having periods for 3 years ago which have always been heavy and prolonged. Investigations show:

Platelets	360 K/mm3	(150-450 K/mm3)
Bleeding time	5 min	1-9 min in adults and 1-13 in children
PT	11	12-13 seconds
aPTT	53	30-50 seconds

What is the management of choice?

- ○ **Cryoprecipitate**
- ○ **Factor VIII precipitate**
- ○ **Desmopressin**
- ○ **Fresh frozen plasma**
- ● **Tranexamic acid**

- ○ **Cryoprecipitate**
- ○ **Factor VIII precipitate**
- ○ **Desmopressin**
- ○ **Fresh frozen plasma**
- ● **Tranexamic acid**

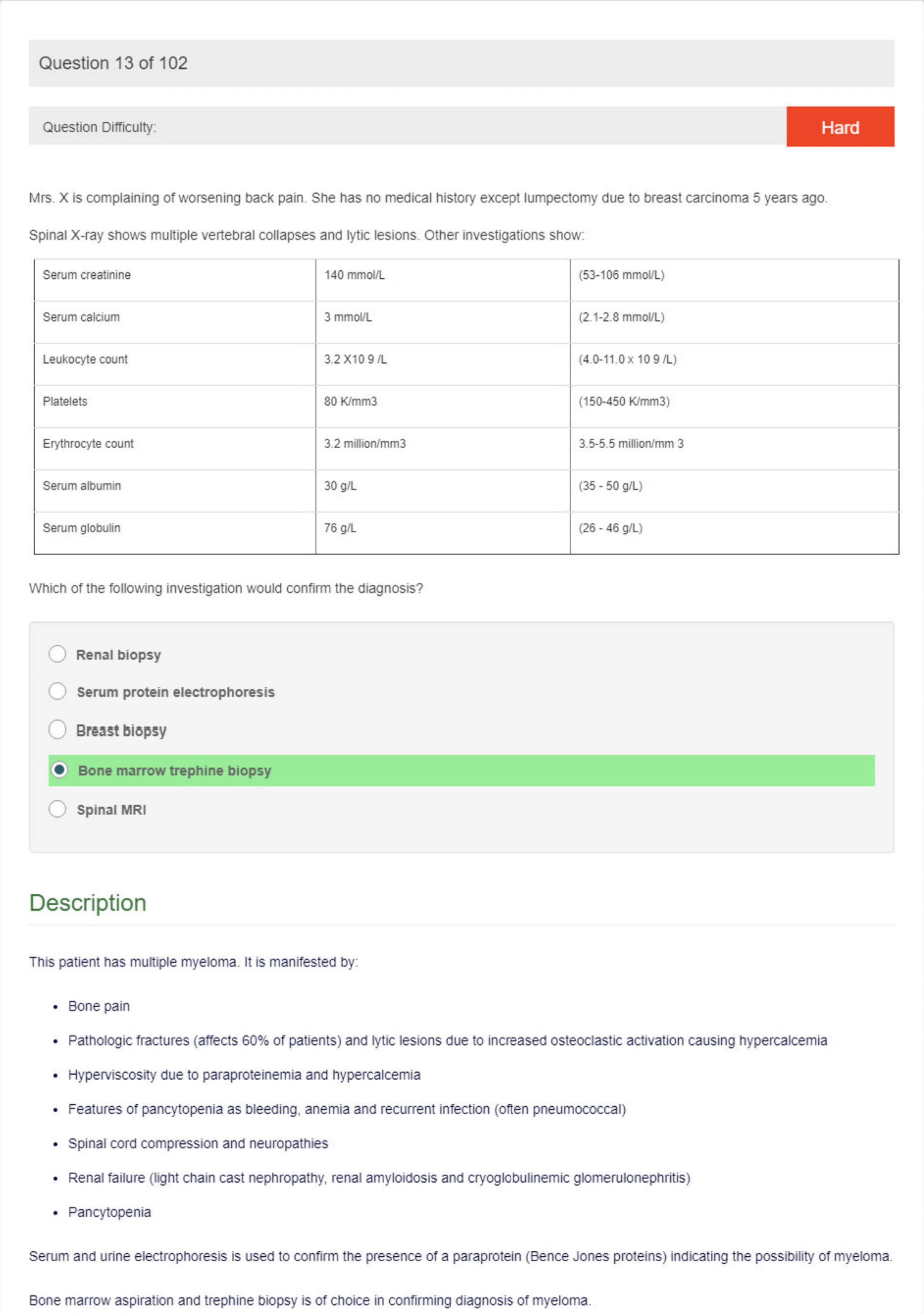
Description

Von Willebrand disease (vWD) is a common, inherited hemorrhagic disorder caused by a deficiency or dysfunction of the von Willebrand factor (vWF) which located on chromosome 12.

The patient gender excludes hemophilia as hemophilia is an X-linked recessive affecting only males except in girls of affected males married to female carriers.

Desmopressin (DDAVP) is the mainstay management; it raises levels of vWF by inducing release of vWF from endothelial cells.

Cryoprecipitate and fresh frozen plasma are alternatives.



Question 13 of 102

Question Difficulty: **Hard**

Mrs. X is complaining of worsening back pain. She has no medical history except lumpectomy due to breast carcinoma 5 years ago.

Spinal X-ray shows multiple vertebral collapses and lytic lesions. Other investigations show:

Serum creatinine	140 mmol/L	(53-106 mmol/L)
Serum calcium	3 mmol/L	(2.1-2.8 mmol/L)
Leukocyte count	3.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	80 K/mm3	(150-450 K/mm3)
Erythrocyte count	3.2 million/mm3	3.5-5.5 million/mm 3
Serum albumin	30 g/L	(35 - 50 g/L)
Serum globulin	76 g/L	(26 - 46 g/L)

Which of the following investigation would confirm the diagnosis?

○ **Renal biopsy**
○ **Serum protein electrophoresis**
○ **Breast biopsy**
● **Bone marrow trephine biopsy**
○ **Spinal MRI**

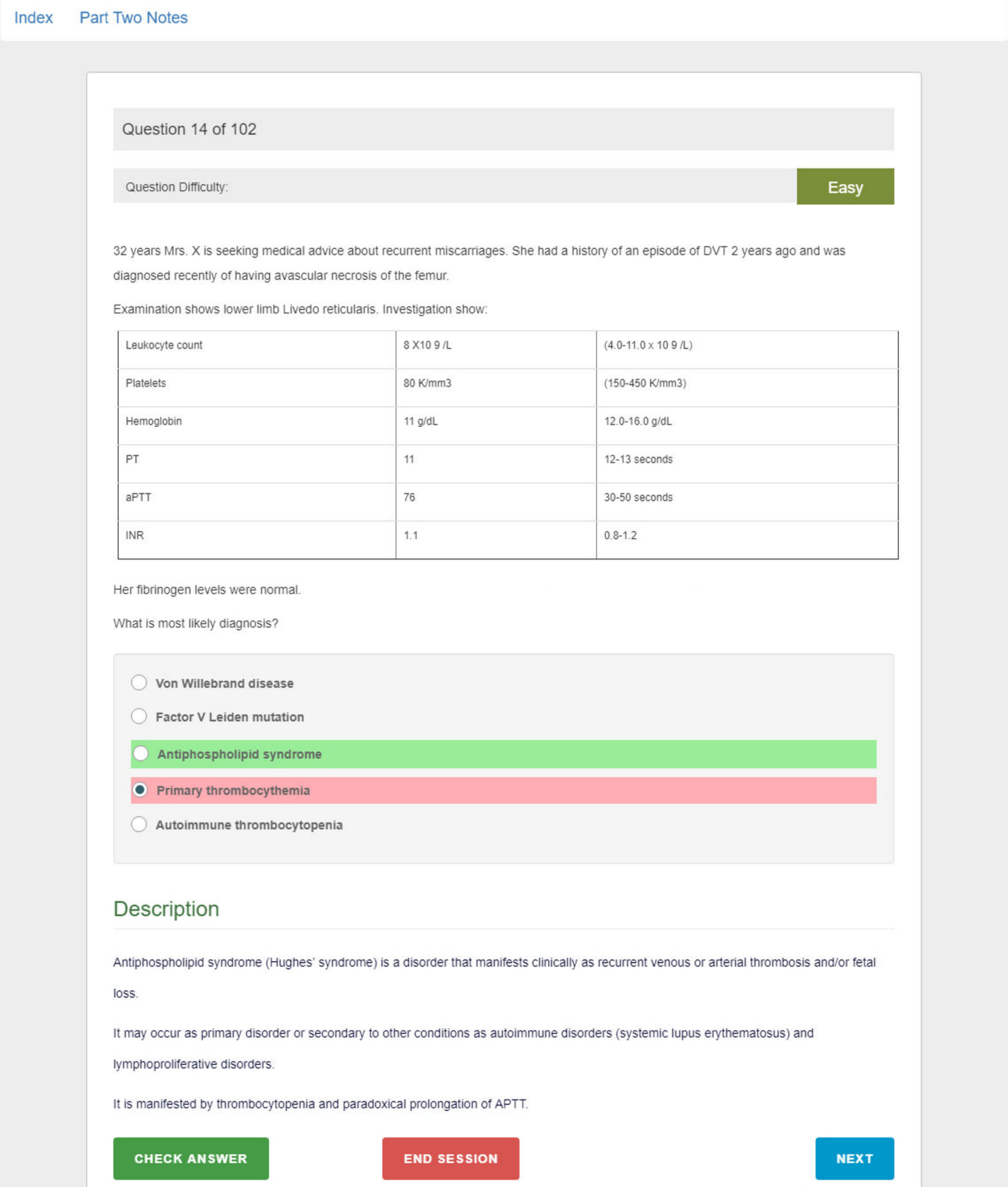
Description

This patient has multiple myeloma. It is manifested by:

- Bone pain
- Pathologic fractures (affects 60% of patients) and lytic lesions due to increased osteoclastic activation causing hypercalcemia
- Hyperviscosity due to paraproteinemia and hypercalcemia
- Features of pancytopenia as bleeding, anemia and recurrent infection (often pneumococcal)
- Spinal cord compression and neuropathies
- Renal failure (light chain cast nephropathy, renal amyloidosis and cryoglobulinemic glomerulonephritis)
- Pancytopenia

Serum and urine electrophoresis is used to confirm the presence of a paraprotein (Bence Jones proteins) indicating the possibility of myeloma.

Bone marrow aspiration and trephine biopsy is of choice in confirming diagnosis of myeloma.



Question 14 of 102

Question Difficulty: **Easy**

32 years Mrs. X is seeking medical advice about recurrent miscarriages. She had a history of an episode of DVT 2 years ago and was diagnosed recently of having avascular necrosis of the femur.

Examination shows lower limb Livedo reticularis. Investigation show:

Leukocyte count	8 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	80 K/mm3	(150-450 K/mm3)
Hemoglobin	11 g/dL	12.0-16.0 g/dL
PT	11	12-13 seconds
aPTT	76	30-50 seconds
INR	1.1	0.8-1.2

Her fibrinogen levels were normal.

What is most likely diagnosis?

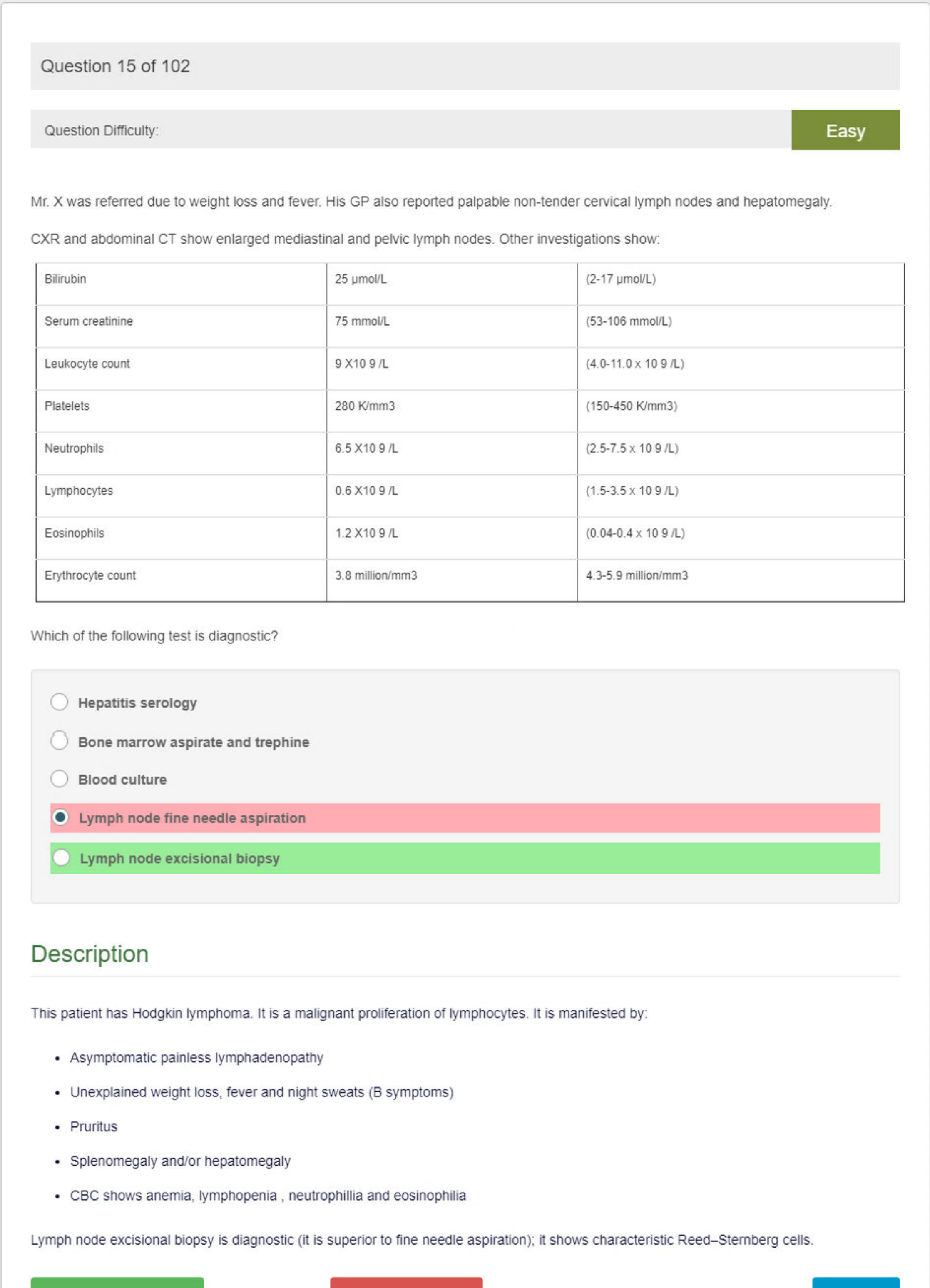
- ○ **Von Willebrand disease**
- ○ **Factor V Leiden mutation**
- ○ **Antiphospholipid syndrome**
- ● **Primary thrombocythemia**
- ○ **Autoimmune thrombocytopenia**

Description

Antiphospholipid syndrome (Hughes' syndrome) is a disorder that manifests clinically as recurrent venous or arterial thrombosis and/or fetal loss.

It may occur as primary disorder or secondary to other conditions as autoimmune disorders (systemic lupus erythematosus) and lymphoproliferative disorders.

It is manifested by thrombocytopenia and paradoxical prolongation of APTT.



Question 15 of 102

Question Difficulty: **Easy**

Mr. X was referred due to weight loss and fever. His GP also reported palpable non-tender cervical lymph nodes and hepatomegaly.

CXR and abdominal CT show enlarged mediastinal and pelvic lymph nodes. Other investigations show:

Bilirubin	25 μmol/L	(2-17 μmol/L)
Serum creatinine	75 mmol/L	(53-106 mmol/L)
Leukocyte count	9 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	280 K/mm3	(150-450 K/mm3)
Neutrophils	6.5 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	0.6 X10 9 /L	(1.5-3.5 x 10 9 /L)
Eosinophils	1.2 X10 9 /L	(0.04-0.4 x 10 9 /L)
Erythrocyte count	3.8 million/mm3	4.3-5.9 million/mm3

Which of the following test is diagnostic?

○ **Hepatitis serology**

○ **Bone marrow aspirate and trephine**

○ **Blood culture**

● **Lymph node fine needle aspiration**

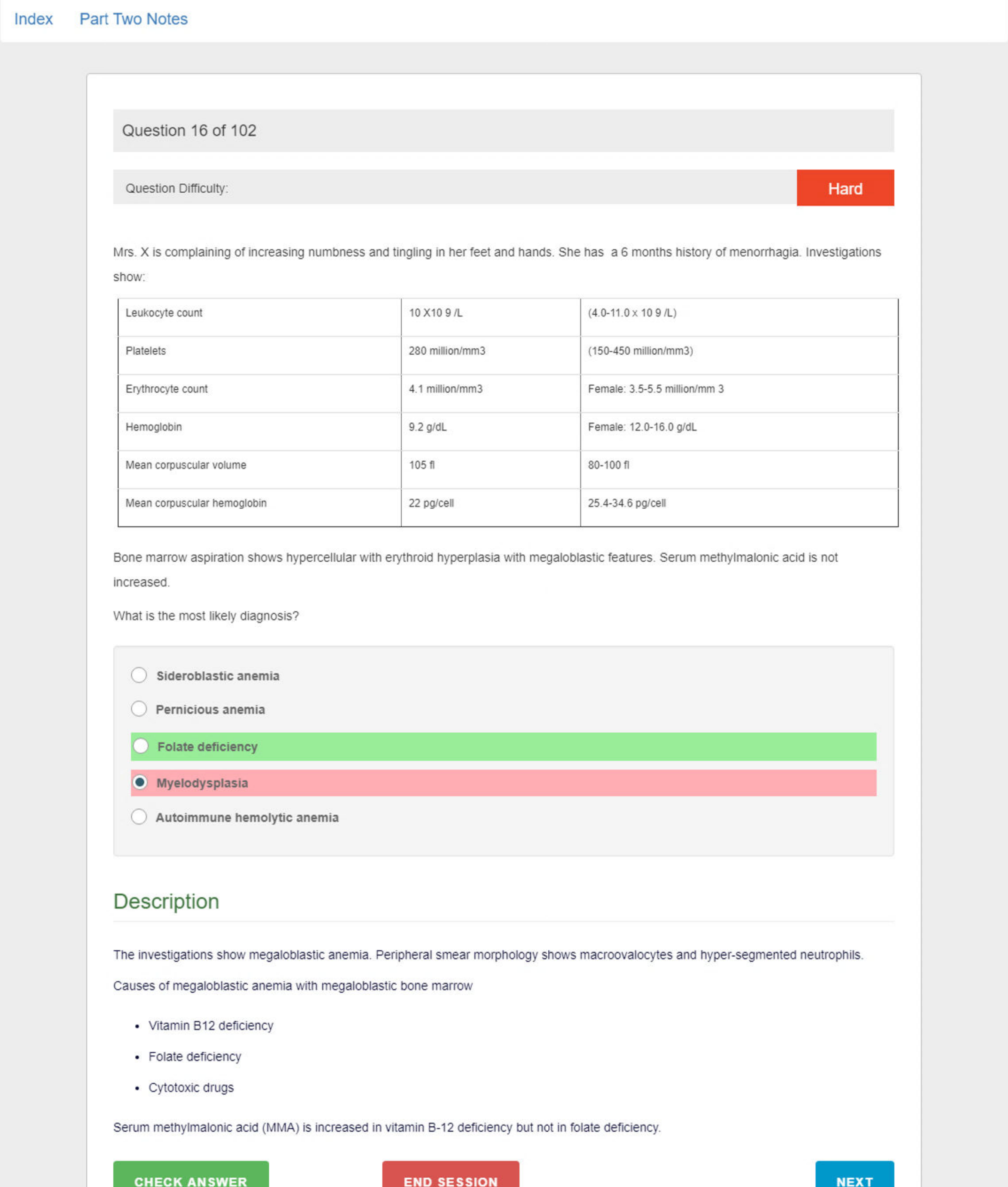
○ **Lymph node excisional biopsy**

Description

This patient has Hodgkin lymphoma. It is a malignant proliferation of lymphocytes. It is manifested by:

- Asymptomatic painless lymphadenopathy
- Unexplained weight loss, fever and night sweats (B symptoms)
- Pruritus
- Splenomegaly and/or hepatomegaly
- CBC shows anemia, lymphopenia , neutrophillia and eosinophilia

Lymph node excisional biopsy is diagnostic (it is superior to fine needle aspiration); it shows characteristic Reed–Sternberg cells.



Question 16 of 102

Question Difficulty: Hard

Mrs. X is complaining of increasing numbness and tingling in her feet and hands. She has a 6 months history of menorrhagia. Investigations show:

Leukocyte count	10 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	280 million/mm3	(150-450 million/mm3)
Erythrocyte count	4.1 million/mm3	Female: 3.5-5.5 million/mm 3
Hemoglobin	9.2 g/dL	Female: 12.0-16.0 g/dL
Mean corpuscular volume	105 fl	80-100 fl
Mean corpuscular hemoglobin	22 pg/cell	25.4-34.6 pg/cell

Bone marrow aspiration shows hypercellular with erythroid hyperplasia with megaloblastic features. Serum methylmalonic acid is not increased.

What is the most likely diagnosis?

○ **Sideroblastic anemia**

○ **Pernicious anemia**

○ **Folate deficiency**

● **Myelodysplasia**

○ **Autoimmune hemolytic anemia**

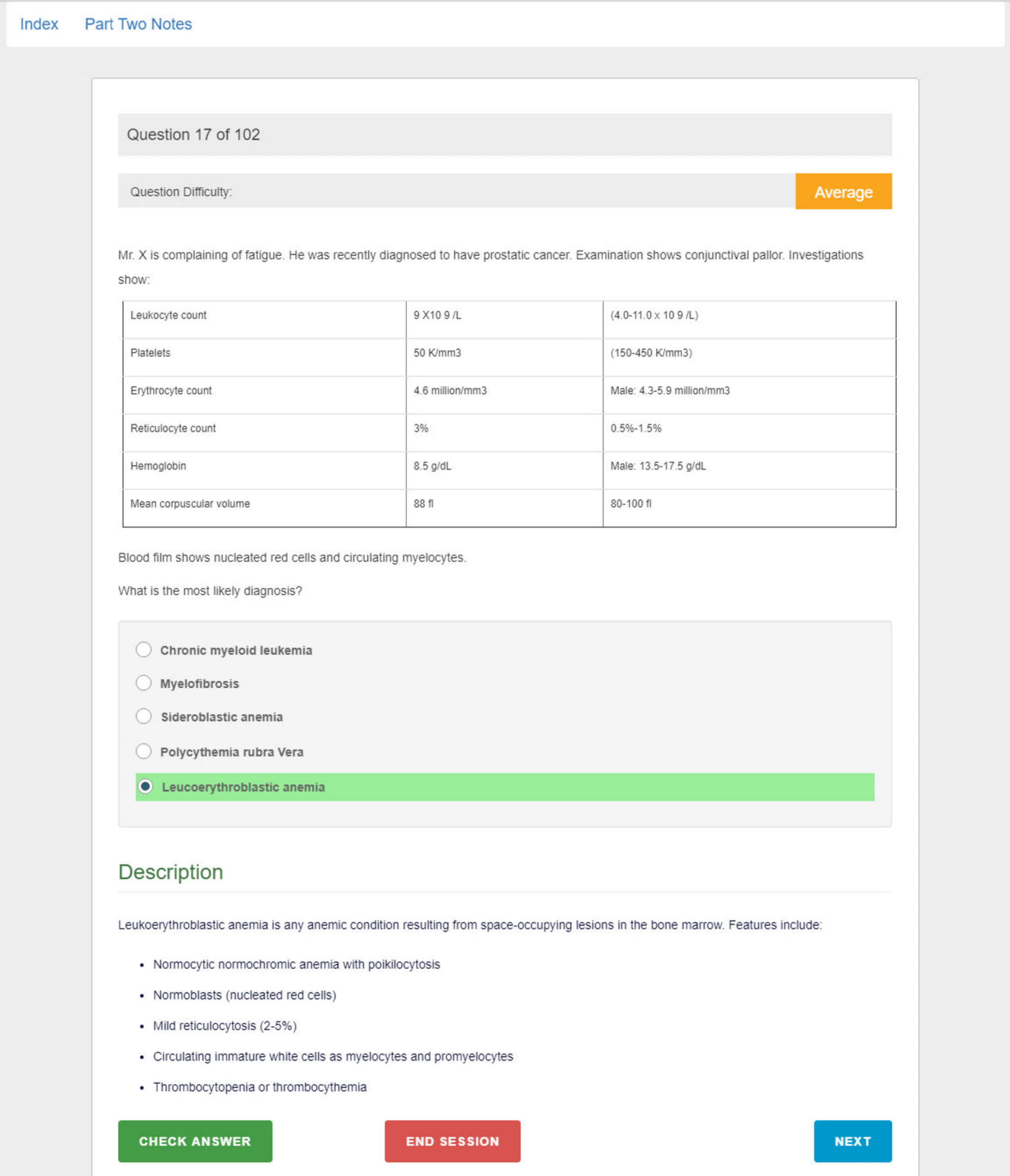
Description

The investigations show megaloblastic anemia. Peripheral smear morphology shows macroovalocytes and hyper-segmented neutrophils.

Causes of megaloblastic anemia with megaloblastic bone marrow

- Vitamin B12 deficiency
- Folate deficiency
- Cytotoxic drugs

Serum methylmalonic acid (MMA) is increased in vitamin B-12 deficiency but not in folate deficiency.



Question 17 of 102

Question Difficulty: **Average**

Mr. X is complaining of fatigue. He was recently diagnosed to have prostatic cancer. Examination shows conjunctival pallor. Investigations show:

Leukocyte count	9 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	50 K/mm3	(150-450 K/mm3)
Erythrocyte count	4.6 million/mm3	Male: 4.3-5.9 million/mm3
Reticulocyte count	3%	0.5%-1.5%
Hemoglobin	8.5 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	88 fl	80-100 fl

Blood film shows nucleated red cells and circulating myelocytes.

What is the most likely diagnosis?

○ **Chronic myeloid leukemia**
○ **Myelofibrosis**
○ **Sideroblastic anemia**
○ **Polycythemia rubra Vera**
● **Leucoerythroblastic anemia**

Description

Leukoerythroblastic anemia is any anemic condition resulting from space-occupying lesions in the bone marrow. Features include:

- Normocytic normochromic anemia with poikilocytosis
- Normoblasts (nucleated red cells)
- Mild reticulocytosis (2-5%)
- Circulating immature white cells as myelocytes and promyelocytes
- Thrombocytopenia or thrombocythemia

Question 18 of 102

Question Difficulty: **Easy**

Mr. X was admitted due to developed heaviness in his left arm and slurred speech. He has three-week history of easy bruising.

Examination shows a Glasgow Coma Scale of 10/15. There are has bruises and rashes on the shins and forearms. Brain MRI shows 2 cerebral embolisms. Investigations show:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	80 million/mm3	(150-450 million/mm3)
Erythrocyte count	4.2 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	10.2 g/dL	Male: 13.5-17.5 g/dL
Serum creatinine	110 mmol/L	(53-106 mmol/L)
PT	16 seconds	12-13 seconds
Bilirubin	42 µmol/L	(2-17 µmol/L)
ALT	35 U/L	(8-20 U/L)

His fibrinogen levels were normal and blood film shows fragmented RBCs.

What is the management of choice?

Serum creatinine	110 mmol/L	(53-106 mmol/L)
PT	16 seconds	12-13 seconds
Bilirubin	42 µmol/L	(2-17 µmol/L)
ALT	35 U/L	(8-20 U/L)

His fibrinogen levels were normal and blood film shows fragmented RBCs.

What is the management of choice?

○ **Platelet transfusion**
○ **Thrombolytic drugs**
● **Clopidogrel**
○ **Plasmapheresis with fresh frozen plasma**
○ **Aspirin**

Description

This patient has thrombotic thrombocytopenic purpura (TTP). It is manifested by:

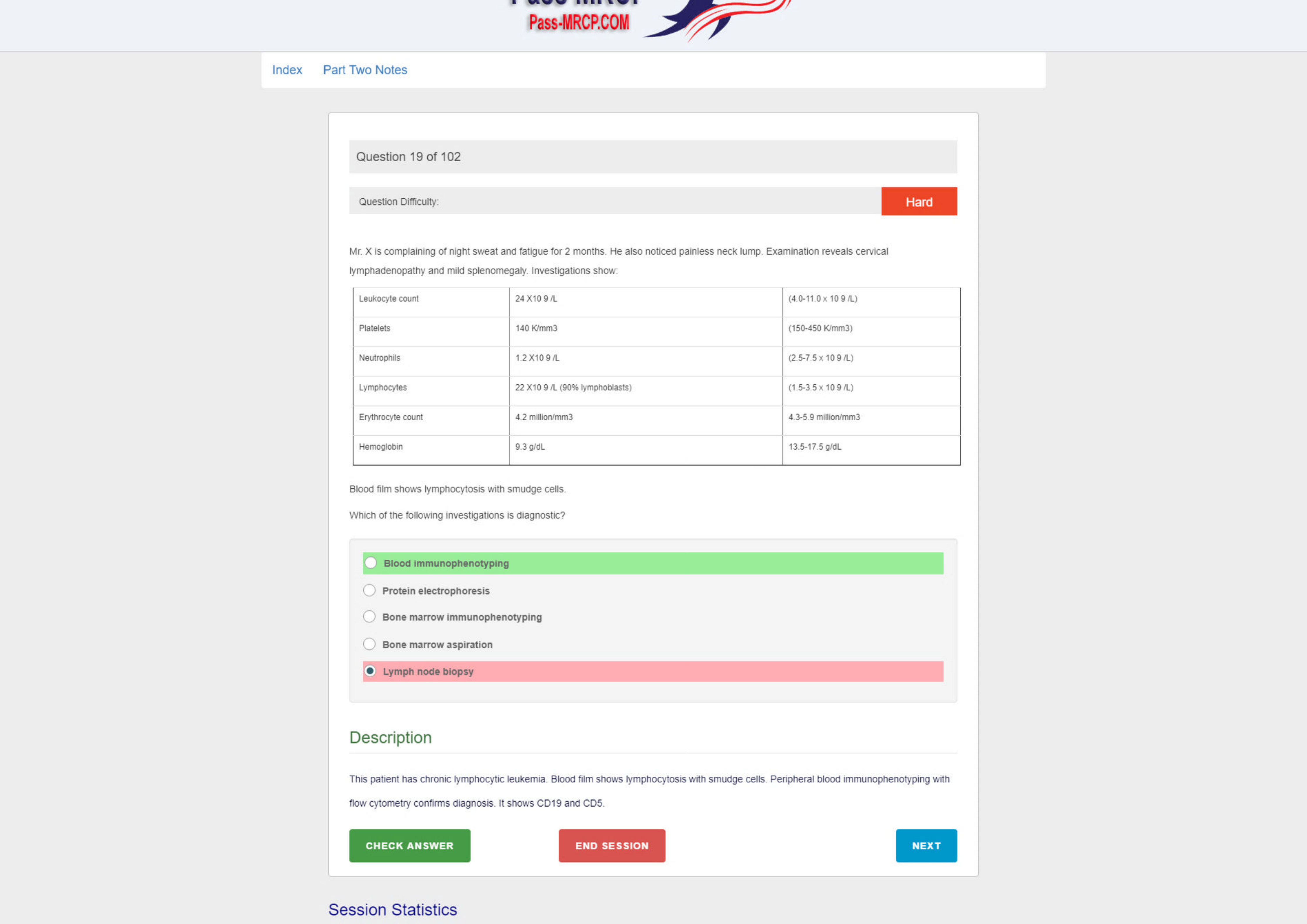
- Fever
- Fluctuating neurologic manifestations due to cerebral embolisms
- Less severe renal involvement than HUS
- Skin purpura
- CBC shows anemia, thrombocytopenia and schistocytes
- Coombs-negative intravascular hemolytic anemia (reticulocytosis, hyperbilirubinemia with decreased haptoglobin)
- Elevated D-dimers with high to high-normal fibrinogen

Plasma exchange with fresh frozen plasma is the therapy of choice.

CHECK ANSWER END SESSION NEXT

Session Statistics

Answered: 17 ✓ **Correct**: 4 ✕ **Incorrect**: 13 **Average Score**: 23.53 %



Question 19 of 102

Question Difficulty: **Hard**

Mr. X is complaining of night sweat and fatigue for 2 months. He also noticed painless neck lump. Examination reveals cervical lymphadenopathy and mild splenomegaly. Investigations show:

Leukocyte count	24 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	140 K/mm3	(150-450 K/mm3)
Neutrophils	1.2 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	22 X10 9 /L (90% lymphoblasts)	(1.5-3.5 x 10 9 /L)
Erythrocyte count	4.2 million/mm3	4.3-5.9 million/mm3
Hemoglobin	9.3 g/dL	13.5-17.5 g/dL

Blood film shows lymphocytosis with smudge cells.

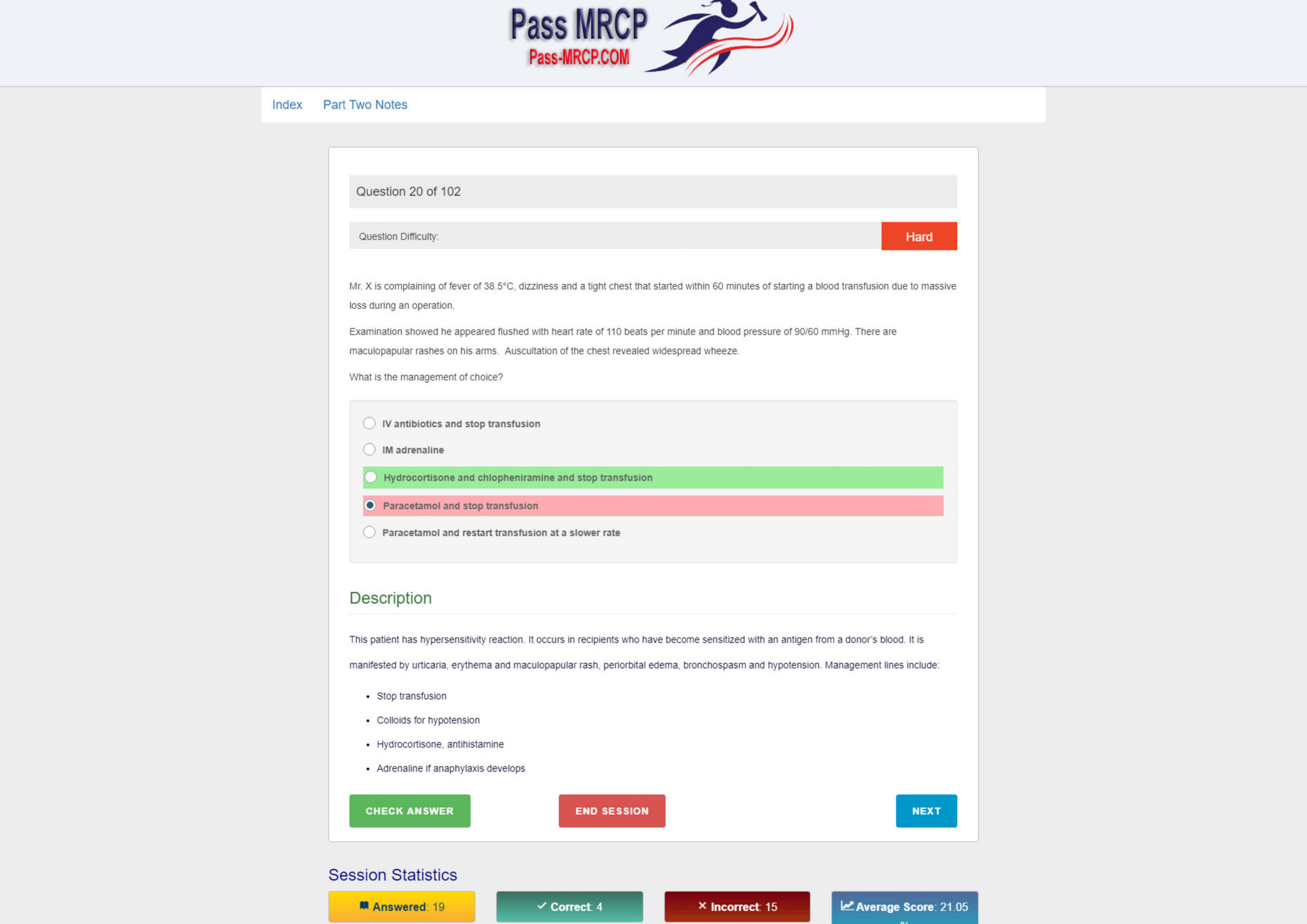
Which of the following investigations is diagnostic?

- ○ **Blood immunophenotyping**
- ○ **Protein electrophoresis**
- ○ **Bone marrow immunophenotyping**
- ○ **Bone marrow aspiration**
- ● **Lymph node biopsy**

Description

This patient has chronic lymphocytic leukemia. Blood film shows lymphocytosis with smudge cells. Peripheral blood immunophenotyping with flow cytometry confirms diagnosis. It shows CD19 and CD5.

Session Statistics



Question 20 of 102

Question Difficulty: Hard

Mr. X is complaining of fever of 38.5°C, dizziness and a tight chest that started within 60 minutes of starting a blood transfusion due to massive loss during an operation.

Examination showed he appeared flushed with heart rate of 110 beats per minute and blood pressure of 90/60 mmHg. There are maculopapular rashes on his arms. Auscultation of the chest revealed widespread wheeze.

What is the management of choice?

○ **IV antibiotics and stop transfusion**
○ **IM adrenaline**
○ **Hydrocortisone and chlopheniramine and stop transfusion**
● **Paracetamol and stop transfusion**
○ **Paracetamol and restart transfusion at a slower rate**

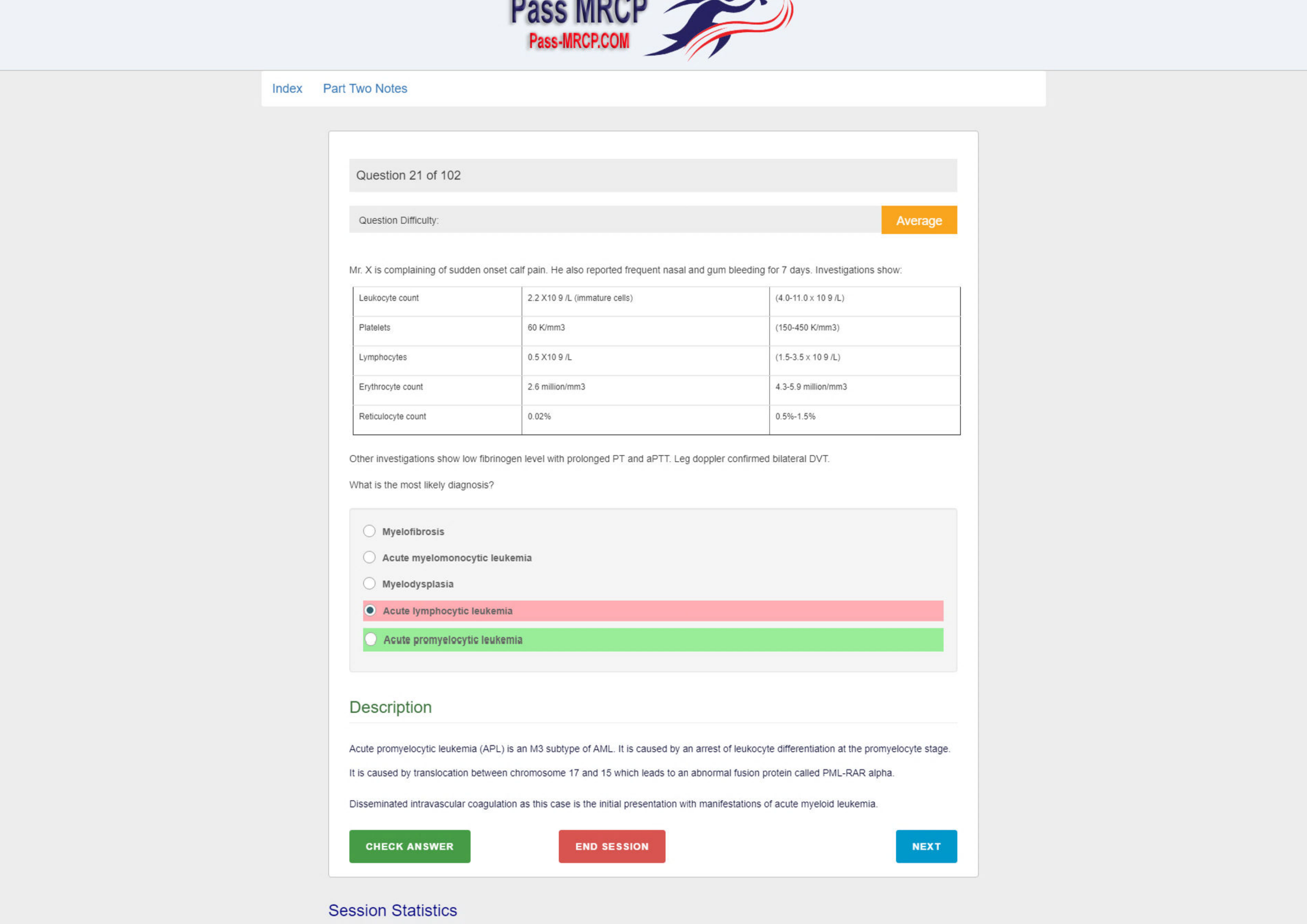
Description

This patient has hypersensitivity reaction. It occurs in recipients who have become sensitized with an antigen from a donor's blood. It is manifested by urticaria, erythema and maculopapular rash, periorbital edema, bronchospasm and hypotension. Management lines include:

- Stop transfusion
- Colloids for hypotension
- Hydrocortisone, antihistamine
- Adrenaline if anaphylaxis develops

Session Statistics

Answered: 19
✓ **Correct**: 4
✕ **Incorrect**: 15
Average Score: 21.05



Question 21 of 102

Question Difficulty: Average

Mr. X is complaining of sudden onset calf pain. He also reported frequent nasal and gum bleeding for 7 days. Investigations show:

Leukocyte count	2.2 X10 9 /L (immature cells)	(4.0-11.0 x 10 9 /L)
Platelets	60 K/mm3	(150-450 K/mm3)
Lymphocytes	0.5 X10 9 /L	(1.5-3.5 x 10 9 /L)
Erythrocyte count	2.6 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	0.02%	0.5%-1.5%

Other investigations show low fibrinogen level with prolonged PT and aPTT. Leg doppler confirmed bilateral DVT.

What is the most likely diagnosis?

- ○ **Myelofibrosis**
- ○ **Acute myelomonocytic leukemia**
- ○ **Myelodysplasia**
- ● **Acute lymphocytic leukemia**
- ○ **Acute promyelocytic leukemia**

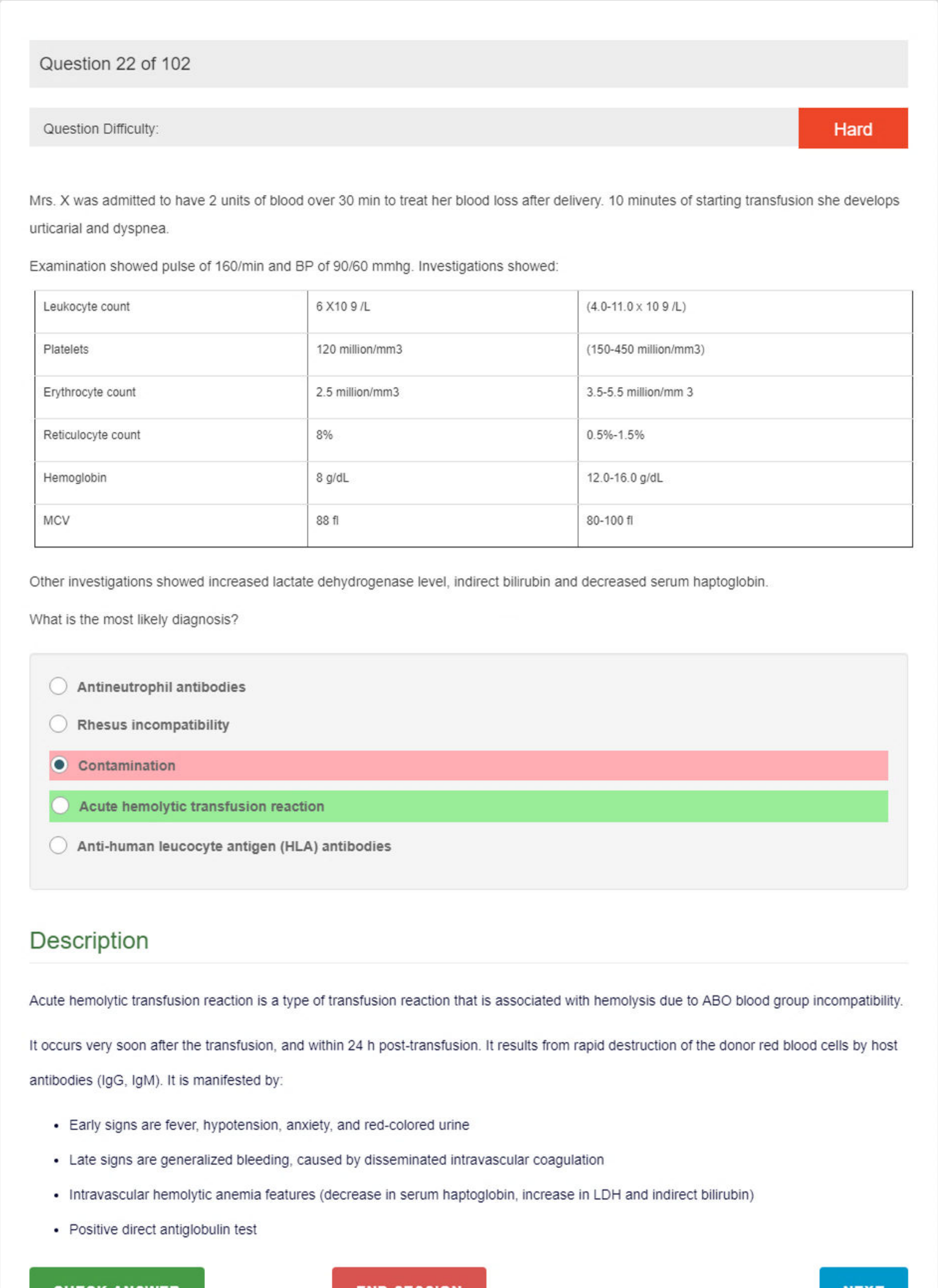
Description

Acute promyelocytic leukemia (APL) is an M3 subtype of AML. It is caused by an arrest of leukocyte differentiation at the promyelocyte stage.

It is caused by translocation between chromosome 17 and 15 which leads to an abnormal fusion protein called PML-RAR alpha.

Disseminated intravascular coagulation as this case is the initial presentation with manifestations of acute myeloid leukemia.

Session Statistics



Question 22 of 102

Question Difficulty: **Hard**

Mrs. X was admitted to have 2 units of blood over 30 min to treat her blood loss after delivery. 10 minutes of starting transfusion she develops urticarial and dyspnea.

Examination showed pulse of 160/min and BP of 90/60 mmhg. Investigations showed:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	120 million/mm3	(150-450 million/mm3)
Erythrocyte count	2.5 million/mm3	3.5-5.5 million/mm 3
Reticulocyte count	8%	0.5%-1.5%
Hemoglobin	8 g/dL	12.0-16.0 g/dL
MCV	88 fl	80-100 fl

Other investigations showed increased lactate dehydrogenase level, indirect bilirubin and decreased serum haptoglobin.

What is the most likely diagnosis?

○ **Antineutrophil antibodies**

○ **Rhesus incompatibility**

● **Contamination**

○ **Acute hemolytic transfusion reaction**

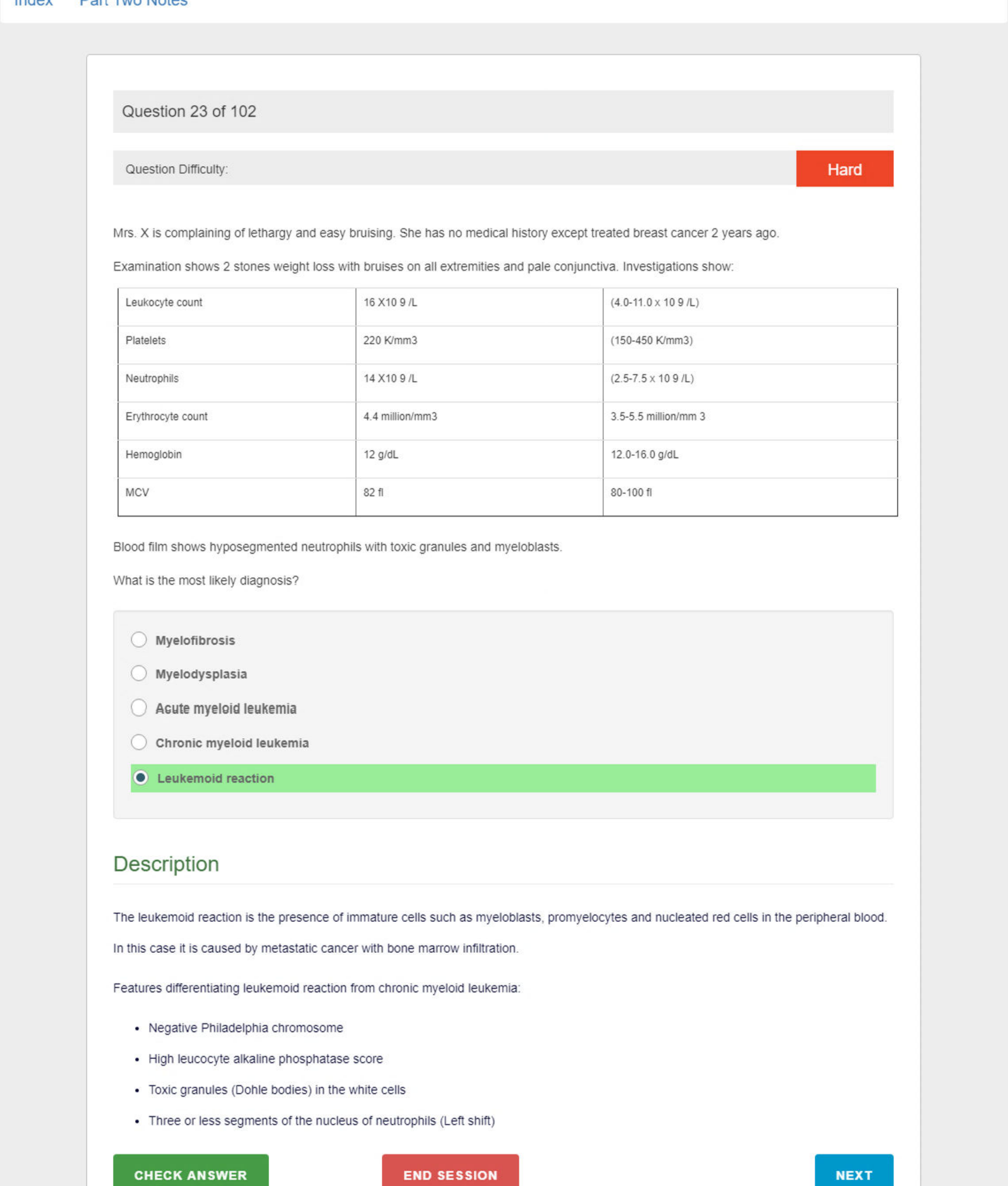
○ **Anti-human leucocyte antigen (HLA) antibodies**

Description

Acute hemolytic transfusion reaction is a type of transfusion reaction that is associated with hemolysis due to ABO blood group incompatibility.

It occurs very soon after the transfusion, and within 24 h post-transfusion. It results from rapid destruction of the donor red blood cells by host antibodies (IgG, IgM). It is manifested by:

- Early signs are fever, hypotension, anxiety, and red-colored urine
- Late signs are generalized bleeding, caused by disseminated intravascular coagulation
- Intravascular hemolytic anemia features (decrease in serum haptoglobin, increase in LDH and indirect bilirubin)
- Positive direct antiglobulin test



Question 23 of 102

Question Difficulty: **Hard**

Mrs. X is complaining of lethargy and easy bruising. She has no medical history except treated breast cancer 2 years ago.

Examination shows 2 stones weight loss with bruises on all extremities and pale conjunctiva. Investigations show:

Leukocyte count	16 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	220 K/mm3	(150-450 K/mm3)
Neutrophils	14 X10 9 /L	(2.5-7.5 x 10 9 /L)
Erythrocyte count	4.4 million/mm3	3.5-5.5 million/mm 3
Hemoglobin	12 g/dL	12.0-16.0 g/dL
MCV	82 fl	80-100 fl

Blood film shows hyposegmented neutrophils with toxic granules and myeloblasts.

What is the most likely diagnosis?

○ **Myelofibrosis**

○ **Myelodysplasia**

○ **Acute myeloid leukemia**

○ **Chronic myeloid leukemia**

● **Leukemoid reaction**

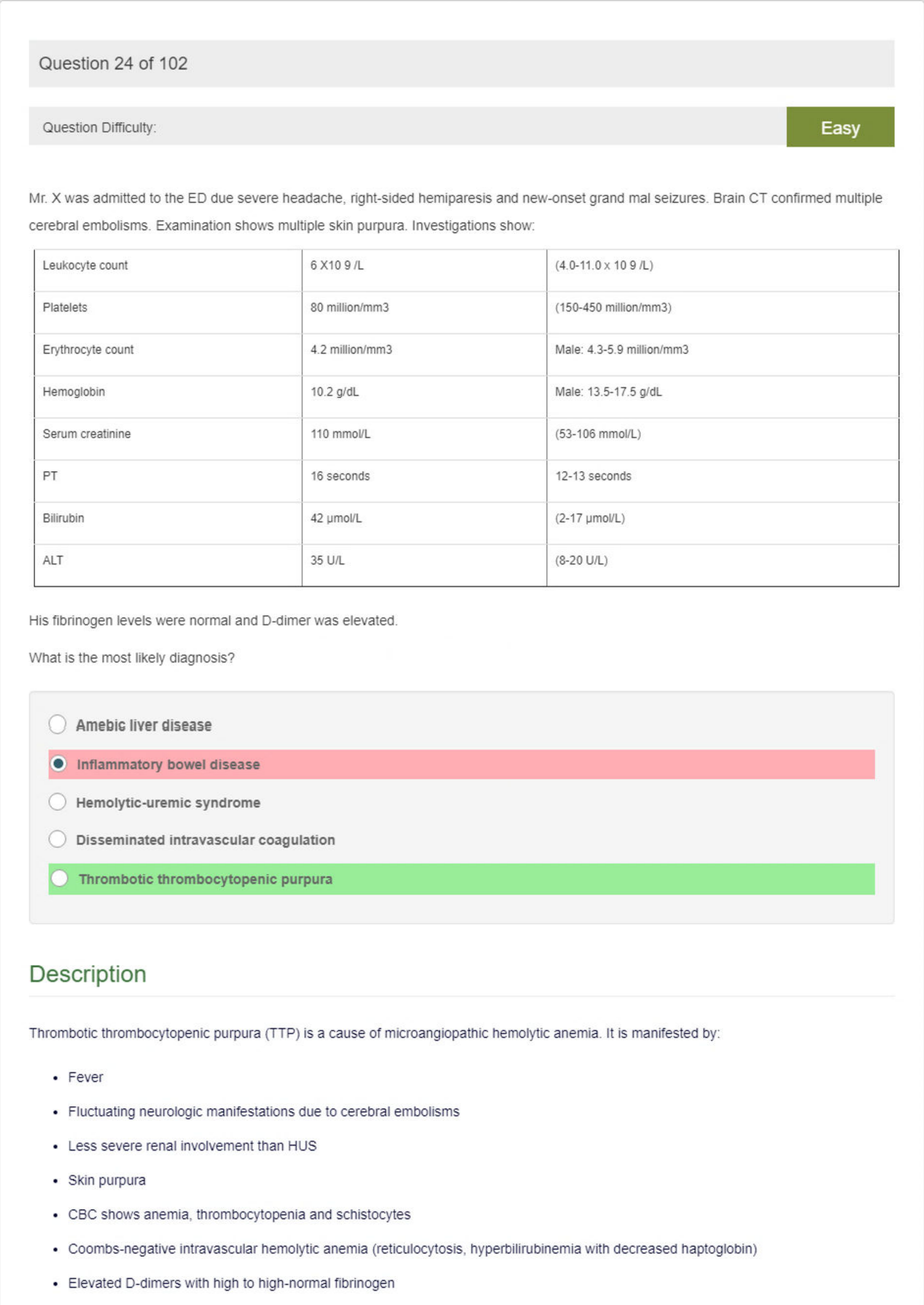
Description

The leukemoid reaction is the presence of immature cells such as myeloblasts, promyelocytes and nucleated red cells in the peripheral blood.

In this case it is caused by metastatic cancer with bone marrow infiltration.

Features differentiating leukemoid reaction from chronic myeloid leukemia:

- Negative Philadelphia chromosome
- High leucocyte alkaline phosphatase score
- Toxic granules (Dohle bodies) in the white cells
- Three or less segments of the nucleus of neutrophils (Left shift)



Question 24 of 102

Question Difficulty: **Easy**

Mr. X was admitted to the ED due severe headache, right-sided hemiparesis and new-onset grand mal seizures. Brain CT confirmed multiple cerebral embolisms. Examination shows multiple skin purpura. Investigations show:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	80 million/mm3	(150-450 million/mm3)
Erythrocyte count	4.2 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	10.2 g/dL	Male: 13.5-17.5 g/dL
Serum creatinine	110 mmol/L	(53-106 mmol/L)
PT	16 seconds	12-13 seconds
Bilirubin	42 µmol/L	(2-17 µmol/L)
ALT	35 U/L	(8-20 U/L)

His fibrinogen levels were normal and D-dimer was elevated.

What is the most likely diagnosis?

○ **Amebic liver disease**

🟥 ● **Inflammatory bowel disease**

○ **Hemolytic-uremic syndrome**

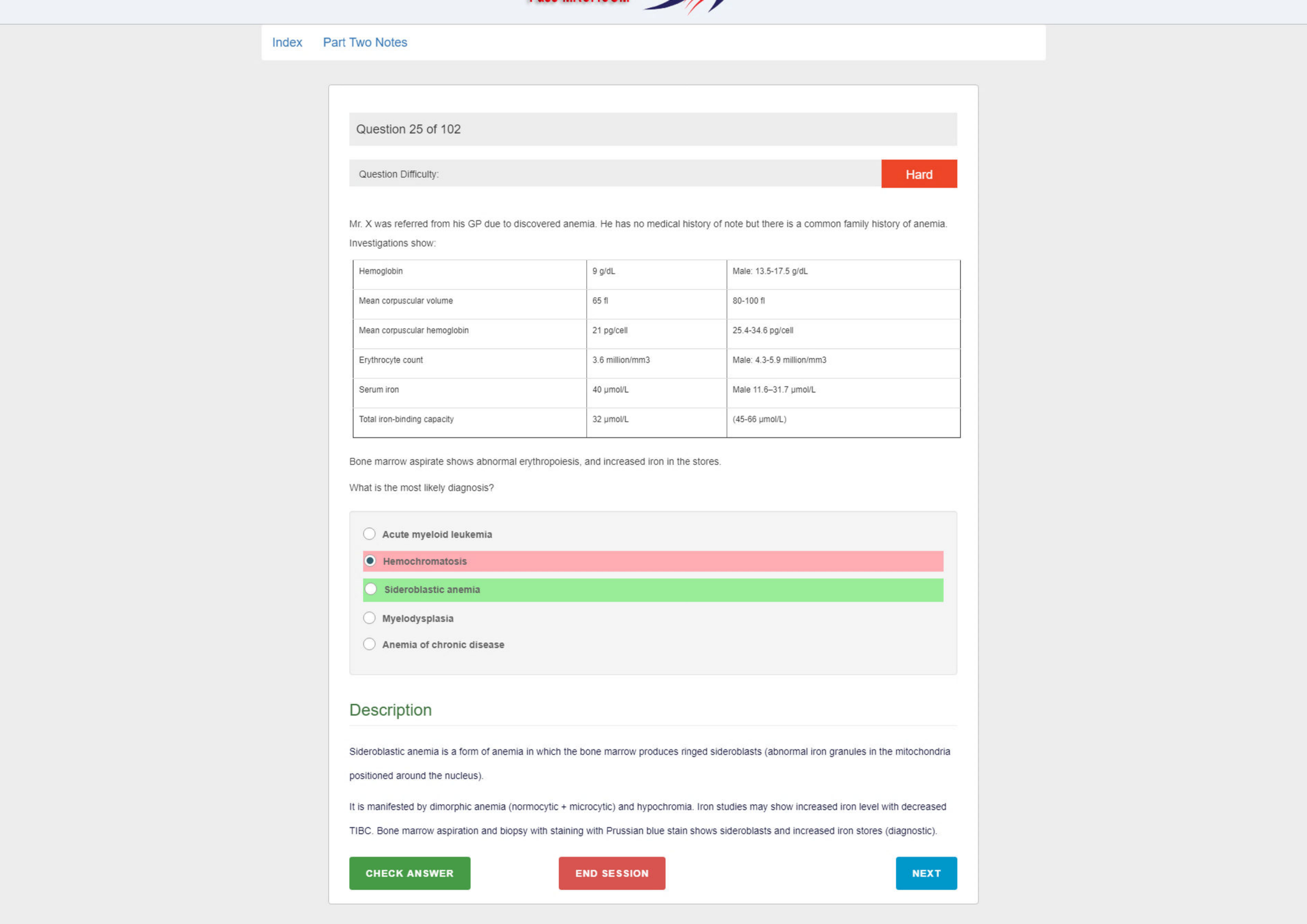
○ **Disseminated intravascular coagulation**

🟩 ○ **Thrombotic thrombocytopenic purpura**

Description

Thrombotic thrombocytopenic purpura (TTP) is a cause of microangiopathic hemolytic anemia. It is manifested by:

- Fever
- Fluctuating neurologic manifestations due to cerebral embolisms
- Less severe renal involvement than HUS
- Skin purpura
- CBC shows anemia, thrombocytopenia and schistocytes
- Coombs-negative intravascular hemolytic anemia (reticulocytosis, hyperbilirubinemia with decreased haptoglobin)
- Elevated D-dimers with high to high-normal fibrinogen



Question 25 of 102

Question Difficulty: **Hard**

Mr. X was referred from his GP due to discovered anemia. He has no medical history of note but there is a common family history of anemia.

Investigations show:

Hemoglobin	9 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	65 fl	80-100 fl
Mean corpuscular hemoglobin	21 pg/cell	25.4-34.6 pg/cell
Erythrocyte count	3.6 million/mm3	Male: 4.3-5.9 million/mm3
Serum iron	40 µmol/L	Male 11.6–31.7 µmol/L
Total iron-binding capacity	32 µmol/L	(45-66 µmol/L)

Bone marrow aspirate shows abnormal erythropoiesis, and increased iron in the stores.

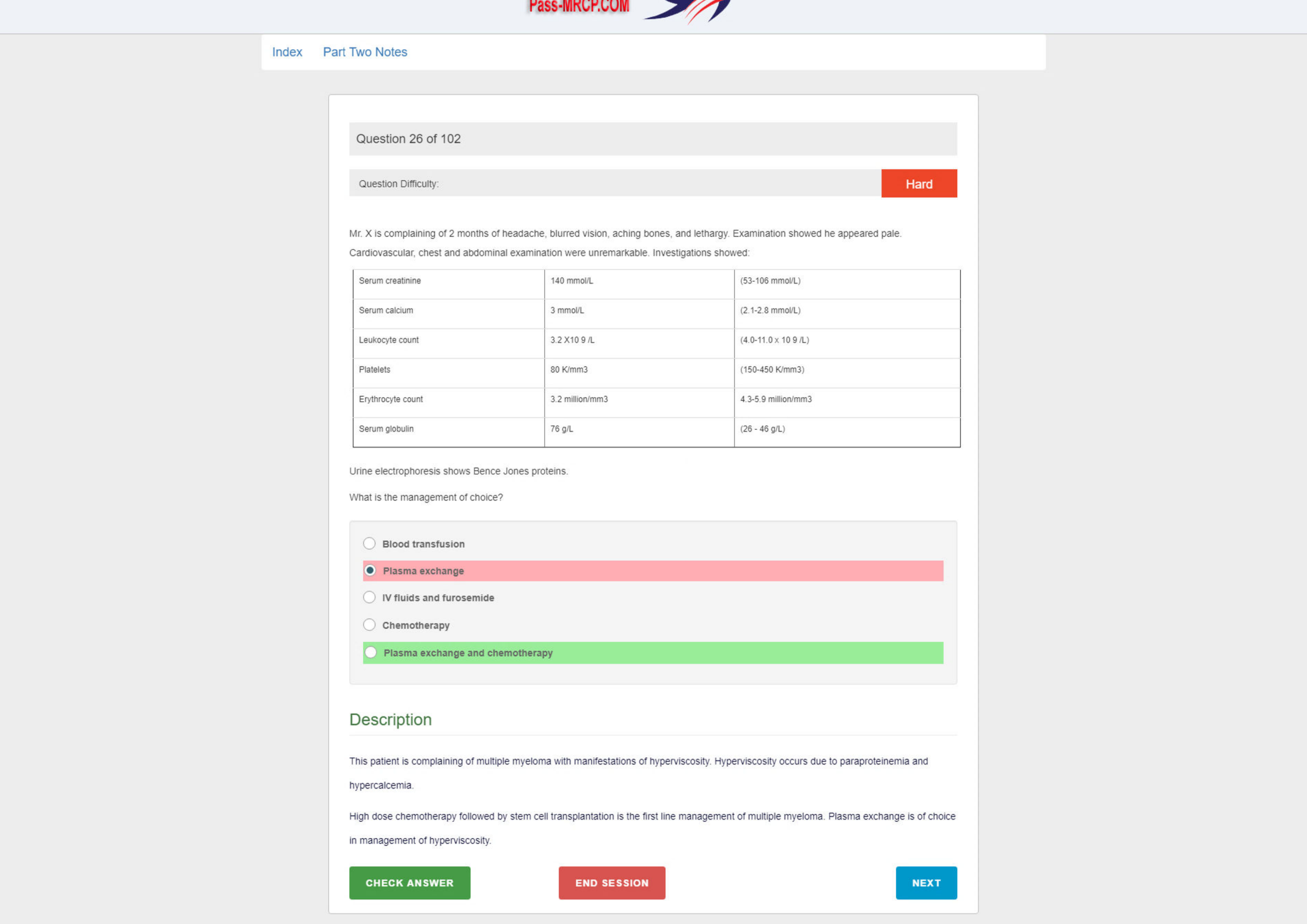
What is the most likely diagnosis?

- ○ **Acute myeloid leukemia**
- ● **Hemochromatosis**
- ○ **Sideroblastic anemia**
- ○ **Myelodysplasia**
- ○ **Anemia of chronic disease**

Description

Sideroblastic anemia is a form of anemia in which the bone marrow produces ringed sideroblasts (abnormal iron granules in the mitochondria positioned around the nucleus).

It is manifested by dimorphic anemia (normocytic + microcytic) and hypochromia. Iron studies may show increased iron level with decreased TIBC. Bone marrow aspiration and biopsy with staining with Prussian blue stain shows sideroblasts and increased iron stores (diagnostic).



Question 26 of 102

Question Difficulty: **Hard**

Mr. X is complaining of 2 months of headache, blurred vision, aching bones, and lethargy. Examination showed he appeared pale. Cardiovascular, chest and abdominal examination were unremarkable. Investigations showed:

Serum creatinine	140 mmol/L	(53-106 mmol/L)
Serum calcium	3 mmol/L	(2.1-2.8 mmol/L)
Leukocyte count	3.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	80 K/mm3	(150-450 K/mm3)
Erythrocyte count	3.2 million/mm3	4.3-5.9 million/mm3
Serum globulin	76 g/L	(26 - 46 g/L)

Urine electrophoresis shows Bence Jones proteins.

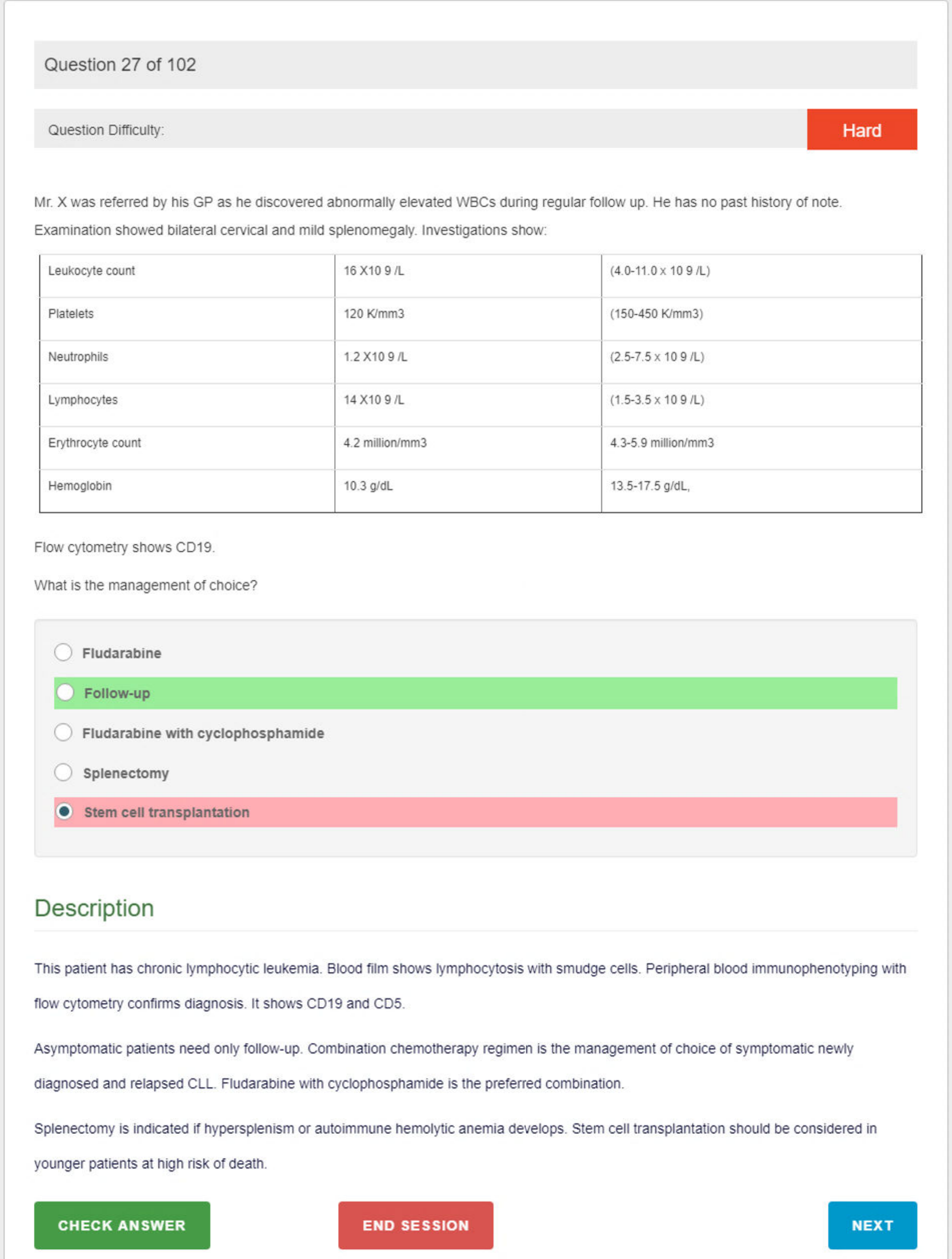
What is the management of choice?

- ○ **Blood transfusion**
- ● **Plasma exchange**
- ○ **IV fluids and furosemide**
- ○ **Chemotherapy**
- ○ **Plasma exchange and chemotherapy**

Description

This patient is complaining of multiple myeloma with manifestations of hyperviscosity. Hyperviscosity occurs due to paraproteinemia and hypercalcemia.

High dose chemotherapy followed by stem cell transplantation is the first line management of multiple myeloma. Plasma exchange is of choice in management of hyperviscosity.



Question 27 of 102

Question Difficulty: **Hard**

Mr. X was referred by his GP as he discovered abnormally elevated WBCs during regular follow up. He has no past history of note. Examination showed bilateral cervical and mild splenomegaly. Investigations show:

Leukocyte count	16 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	120 K/mm3	(150-450 K/mm3)
Neutrophils	1.2 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	14 X10 9 /L	(1.5-3.5 x 10 9 /L)
Erythrocyte count	4.2 million/mm3	4.3-5.9 million/mm3
Hemoglobin	10.3 g/dL	13.5-17.5 g/dL,

Flow cytometry shows CD19.

What is the management of choice?

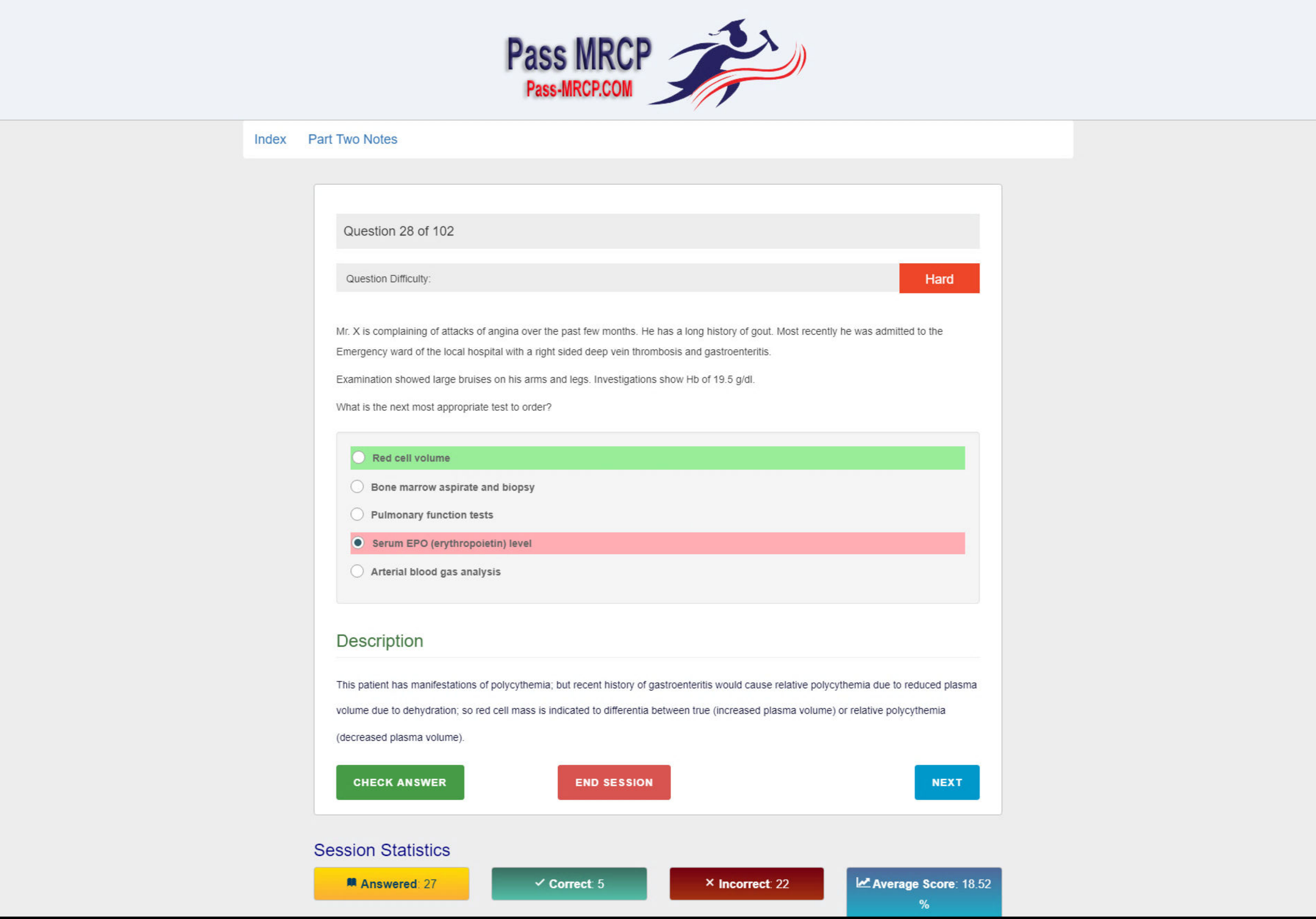
- ○ **Fludarabine**
- ○ **Follow-up**
- ○ **Fludarabine with cyclophosphamide**
- ○ **Splenectomy**
- ● **Stem cell transplantation**

Description

This patient has chronic lymphocytic leukemia. Blood film shows lymphocytosis with smudge cells. Peripheral blood immunophenotyping with flow cytometry confirms diagnosis. It shows CD19 and CD5.

Asymptomatic patients need only follow-up. Combination chemotherapy regimen is the management of choice of symptomatic newly diagnosed and relapsed CLL. Fludarabine with cyclophosphamide is the preferred combination.

Splenectomy is indicated if hypersplenism or autoimmune hemolytic anemia develops. Stem cell transplantation should be considered in younger patients at high risk of death.



Question 28 of 102

Question Difficulty: Hard

Mr. X is complaining of attacks of angina over the past few months. He has a long history of gout. Most recently he was admitted to the Emergency ward of the local hospital with a right sided deep vein thrombosis and gastroenteritis.

Examination showed large bruises on his arms and legs. Investigations show Hb of 19.5 g/dl.

What is the next most appropriate test to order?

- ○ Red cell volume
- ○ Bone marrow aspirate and biopsy
- ○ Pulmonary function tests
- ● Serum EPO (erythropoietin) level
- ○ Arterial blood gas analysis

Description

This patient has manifestations of polycythemia; but recent history of gastroenteritis would cause relative polycythemia due to reduced plasma volume due to dehydration; so red cell mass is indicated to differentia between true (increased plasma volume) or relative polycythemia (decreased plasma volume).

Session Statistics

Answered: 27

✓ Correct: 5

✕ Incorrect: 22

Average Score: 18.52 %

Question 29 of 102

Question Difficulty: **Average**

Mr. X is complaining of increasing abdominal pain and nausea for 2 months. He has also reported mild fever, night sweats and gradual weight loss.

Examination shows bilateral cervical lymphadenopathy. There is moderate hepatomegaly and ascites. Investigations show:

Bilirubin	25 µmol/L	(2-17 µmol/L)
Serum creatinine	75 mmol/L	(53-106 mmol/L)
Leukocyte count	4.5 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	280 K/mm3	(150-450 K/mm3)
Neutrophils	2.2 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	0.6 X10 9 /L	(1.5-3.5 x 10 9 /L)
Eosinophils	1.2 X10 9 /L	(0.04-0.4 x 10 9 /L)
Erythrocyte count	3.8 million/mm3	4.3-5.9 million/mm3
Hemoglobin	11 g/dL	13.5-17.5 g/dL

Lymph node excisional biopsy shows picture suggestive for high-grade lymphoma.

Neutrophils	2.2 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	0.6 X10 9 /L	(1.5-3.5 x 10 9 /L)
Eosinophils	1.2 X10 9 /L	(0.04-0.4 x 10 9 /L)
Erythrocyte count	3.8 million/mm3	4.3-5.9 million/mm3
Hemoglobin	11 g/dL	13.5-17.5 g/dL

Lymph node excisional biopsy shows picture suggestive for high-grade lymphoma.

Which of the following translocations would be likely found?

○ **14:11**
○ **8:21**
○ **2:5**
○ **8:14**
● **9:21**

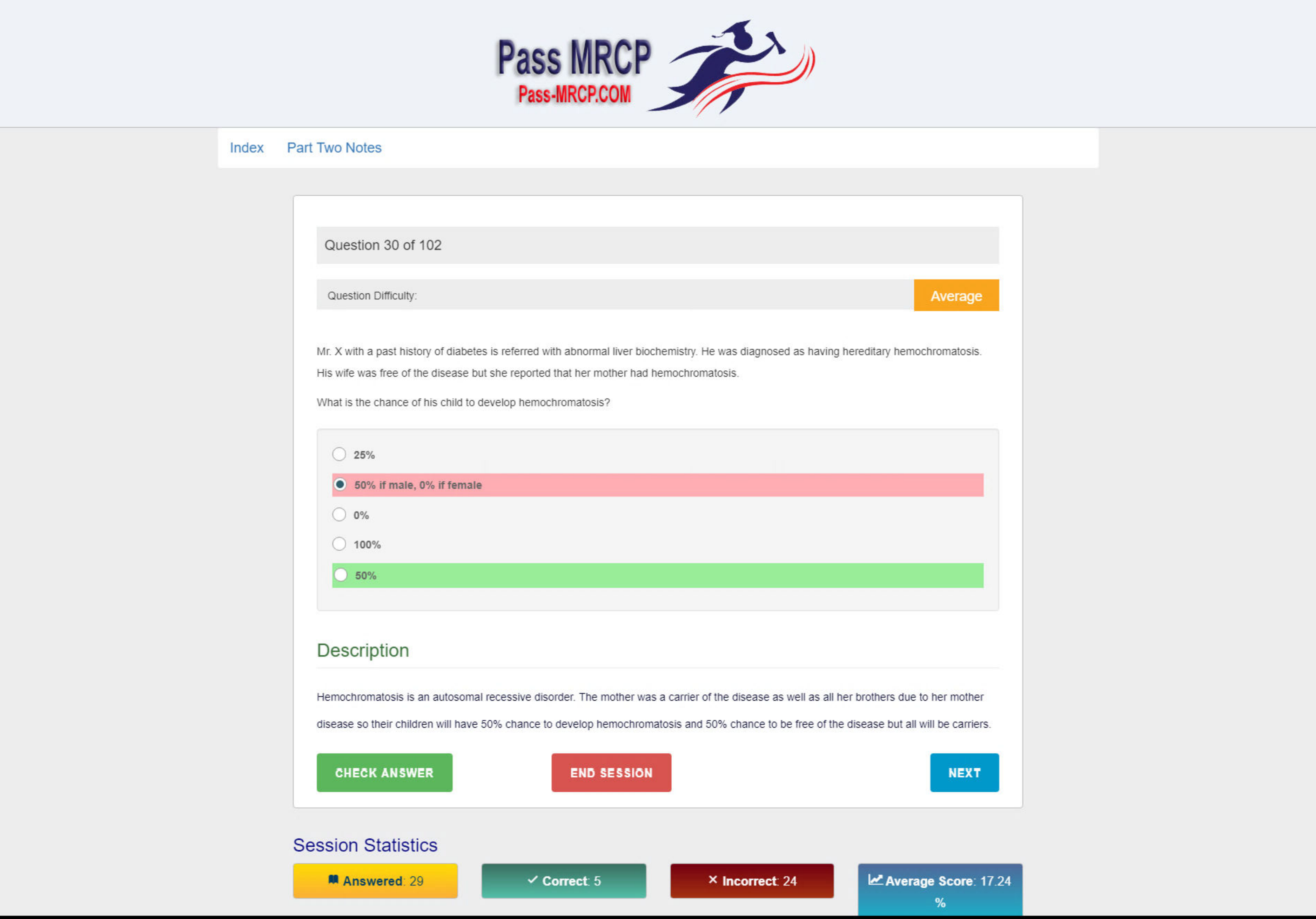
Description

This patient has Burkitt lymphoma. It is a high-grade non-Hodgkin lymphomas associated with translocation and deregulation of the c-myc gene on chromosome 8 t (8:14).

CHECK ANSWER END SESSION NEXT

Session Statistics

Answered: 28 ✓ **Correct**: 5 ✕ **Incorrect**: 23 **Average Score**: 17.86 %



Question 30 of 102

Question Difficulty: Average

Mr. X with a past history of diabetes is referred with abnormal liver biochemistry. He was diagnosed as having hereditary hemochromatosis. His wife was free of the disease but she reported that her mother had hemochromatosis.

What is the chance of his child to develop hemochromatosis?

- ○ 25%
- ● 50% if male, 0% if female
- ○ 0%
- ○ 100%
- ○ 50%

Description

Hemochromatosis is an autosomal recessive disorder. The mother was a carrier of the disease as well as all her brothers due to her mother disease so their children will have 50% chance to develop hemochromatosis and 50% chance to be free of the disease but all will be carriers.

Session Statistics

Answered: 29
✓ Correct: 5
✕ Incorrect: 24
Average Score: 17.24 %

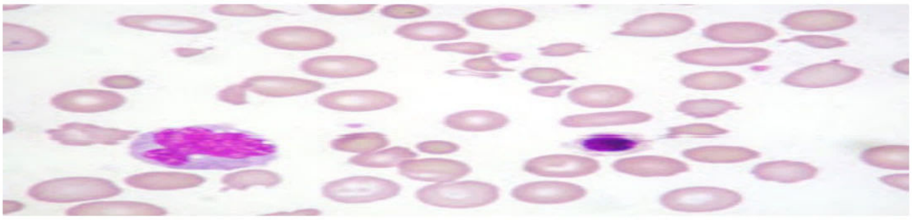
Question 31 of 102

Question Difficulty: **Hard**

Mr. X is complaining of easy bleeding from nose and gums and even from skin when shaving. He had a recent radiotherapy of a lung cancer and an episode of DVT and on management with heparin. Investigations showed:

Leukocyte count	8.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	40 million/mm3	(150-450 million/mm3)
Erythrocyte count	4.2 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	10.2 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	102 fl	80-100 fl
Bilirubin	46 µmol/L	(2-17 µmol/L)
Serum haptoglobin	Decreased	

His PT and aPTT was prolonged and his fibrinogen levels were decreased. Blood film is shown in the image.



What is the most likely diagnosis?

○ **Disseminated intravascular coagulation**

○ **Fibrin deficiency**

○ **Heparin induced thrombocytopenia**

● **Liver metastases**

○ **Bone metastases**

Description

Disseminated intravascular coagulation (DIC) is a pathological process characterized by the widespread activation of the clotting cascade that results in the formation of blood clots in the small blood vessels. It can lead to multiple organ damage. It is manifested by:

- CNS stroke
- Deep vein thrombosis
- Shock
- Renal failure
- Hepatic dysfunction
- Respiratory dyspnea, hemoptysis, and cough

LAB findings include:

- Moderate-to-severe thrombocytopenia with schistocytes (fragmented RBC shown in the image)
- Prolonged aPTT and PT
- Elevated D-dimer
- Decreased fibrinogen levels (specific)

CHECK ANSWER END SESSION NEXT

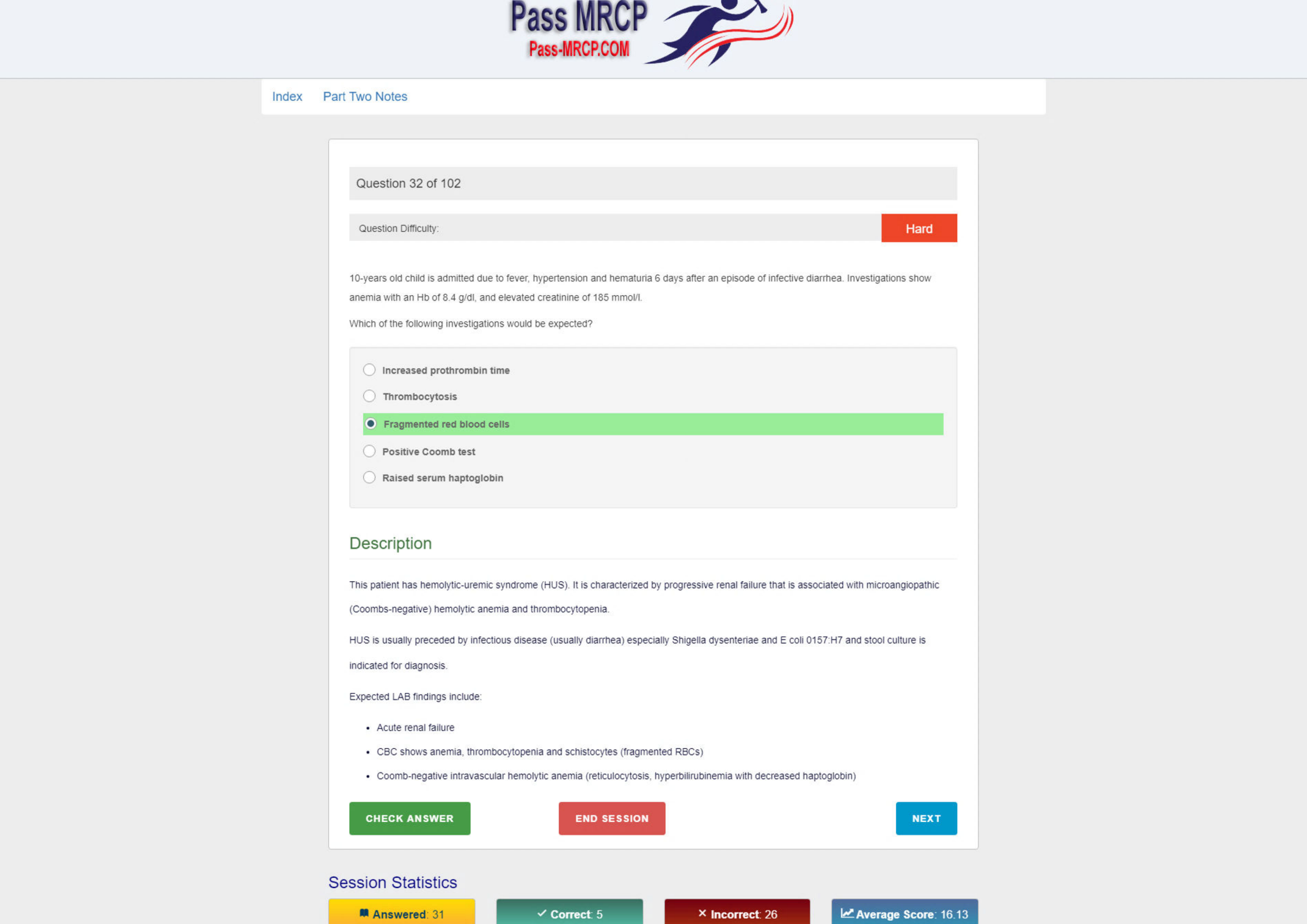
Session Statistics

Answered: 30

✓ **Correct**: 5

✕ **Incorrect**: 25

Average Score: 16.67 %



Question 32 of 102

Question Difficulty: Hard

10-years old child is admitted due to fever, hypertension and hematuria 6 days after an episode of infective diarrhea. Investigations show anemia with an Hb of 8.4 g/dl, and elevated creatinine of 185 mmol/l.

Which of the following investigations would be expected?

○ **Increased prothrombin time**
○ **Thrombocytosis**
● **Fragmented red blood cells**
○ **Positive Coomb test**
○ **Raised serum haptoglobin**

Description

This patient has hemolytic-uremic syndrome (HUS). It is characterized by progressive renal failure that is associated with microangiopathic (Coombs-negative) hemolytic anemia and thrombocytopenia.

HUS is usually preceded by infectious disease (usually diarrhea) especially Shigella dysenteriae and E coli 0157:H7 and stool culture is indicated for diagnosis.

Expected LAB findings include:

- Acute renal failure
- CBC shows anemia, thrombocytopenia and schistocytes (fragmented RBCs)
- Coomb-negative intravascular hemolytic anemia (reticulocytosis, hyperbilirubinemia with decreased haptoglobin)

Session Statistics

Answered: 31
✓ Correct: 5
✕ Incorrect: 26
Average Score: 16.13

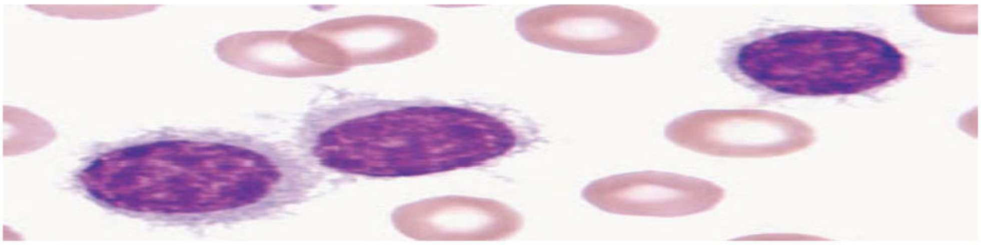
Question 33 of 102

Question Difficulty: **Hard**

Mr. X was referred by his GP due to cellulitis of his right leg that has been difficult to treat with oral antibiotics. Examination shows pale conjunctivae and multiple bruises over all four limbs. There ispalpable spleen 10 cm below the costal margin. Investigations show:

Leukocyte count	12 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	60 K/mm3	(150-450 K/mm3)
Neutrophils	0.5 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	10.8 X10 9 /L	(1.5-3.5 x 10 9 /L)
Erythrocyte count	3.7 million/mm3	4.3-5.9 million/mm3
Hemoglobin	9 g/dL	13.5-17.5 g/dL

Blood film is shown in the image. Bone marrow aspirate shows dry tap. Bone marrow biopsy shows cells with a 'fried egg appearance'. Tartrate-resistant acid phosphatase stain (TRAP) was strongly positive.



What is the most likely diagnosis?

○ **Acute myeloid leukemia**

○ **Hairy-cell leukemia**

● **Chronic myeloid leukemia**

○ **Chronic lymphocytic leukemia**

○ **Acute lymphocytic leukemia**

Description

Hairy cell leukemia is a B-cell disease with abnormal cell has hair-like cytoplasmic projections on its surface shown in the image. It is manifested by:

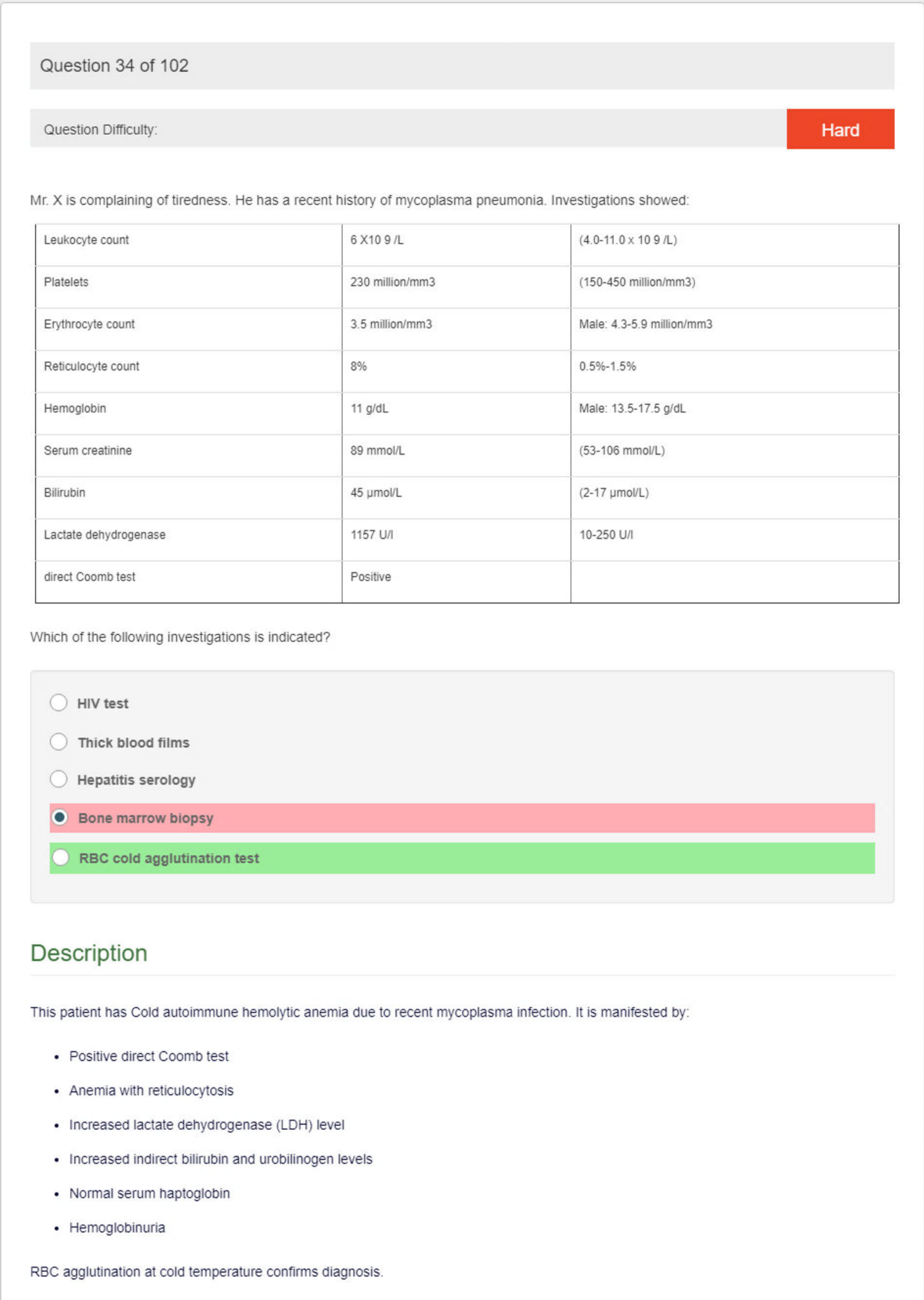
- Weight loss, fever and night sweats
- Anemia, neutropenia and thrombocytopenia
- Organ infiltration of the reticuloendothelial system
- Recurrent infections with gram positive and gram negative bacterial infections, as well as atypical mycobacterial and invasive fungal infections
- Splenomegaly

Bone marrow biopsy with tartrate-resistant acid phosphatase (TRAP) staining shows hairy cells (diagnostic).

CHECK ANSWER END SESSION NEXT

Session Statistics

Answered: 32 ✓ **Correct**: 6 ✕ **Incorrect**: 26 **Average Score**: 18.75 %



Question 34 of 102

Question Difficulty: **Hard**

Mr. X is complaining of tiredness. He has a recent history of mycoplasma pneumonia. Investigations showed:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	230 million/mm3	(150-450 million/mm3)
Erythrocyte count	3.5 million/mm3	Male: 4.3-5.9 million/mm3
Reticulocyte count	8%	0.5%-1.5%
Hemoglobin	11 g/dL	Male: 13.5-17.5 g/dL
Serum creatinine	89 mmol/L	(53-106 mmol/L)
Bilirubin	45 µmol/L	(2-17 µmol/L)
Lactate dehydrogenase	1157 U/l	10-250 U/l
direct Coomb test	Positive	

Which of the following investigations is indicated?

○ **HIV test**

○ **Thick blood films**

○ **Hepatitis serology**

● **Bone marrow biopsy**

○ **RBC cold agglutination test**

Description

This patient has Cold autoimmune hemolytic anemia due to recent mycoplasma infection. It is manifested by:

- Positive direct Coomb test
- Anemia with reticulocytosis
- Increased lactate dehydrogenase (LDH) level
- Increased indirect bilirubin and urobilinogen levels
- Normal serum haptoglobin
- Hemoglobinuria

RBC agglutination at cold temperature confirms diagnosis.

Question 35 of 102

Question Difficulty: **Hard**

Mr. X was reviewed in medical unite for regular checkup and was found to have a 10-cm splenomegaly. He has never travelled outside Europe. He is otherwise well and has no other physical findings except mild pallor. Investigations show:

Leukocyte count	22 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	500 K/mm3	(150-450 K/mm3)
Neutrophils	20 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	1.2 X10 9 /L	(1.5-3.5 x 10 9 /L)
Eosinophils	0.9 X10 9 /L	(0.04-0.4 x 10 9 /L)
Erythrocyte count	3.4 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	0.01%	0.5%-1.5%
Hemoglobin	10 g/dL	13.5-17.5 g/dL
Mean corpuscular volume	82 fl	80-100 fl

What is the most likely diagnosis?

○ **B-Thalassemia minor**
○ **Acute myeloid leukemia**
● **Chronic myeloid leukemia**
○ **Iron deficiency anemia**
○ **Myelodysplasia**

Description

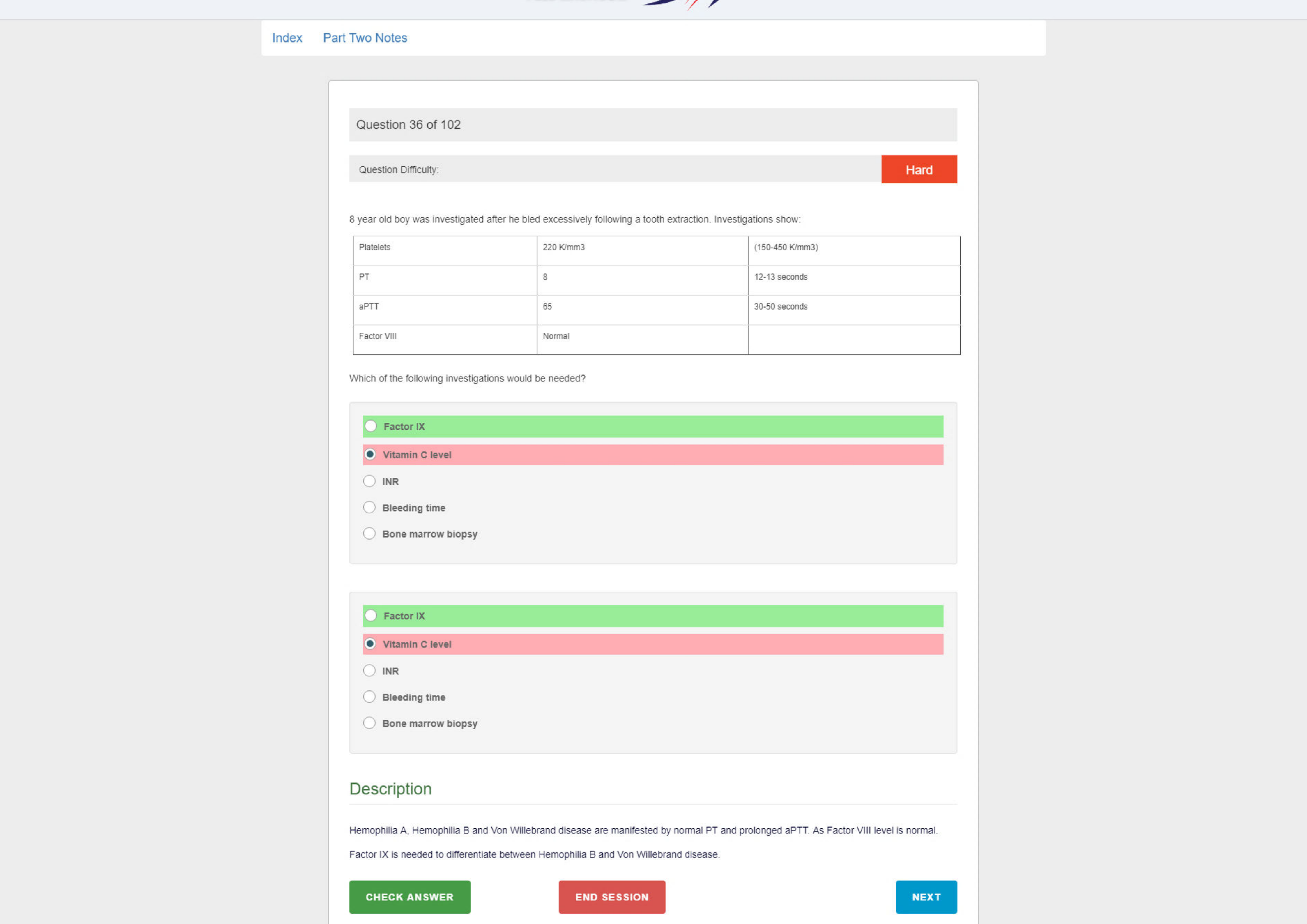
Chronic myeloid leukemia (CML) is a myeloproliferative disorder characterized by increased proliferation of the granulocytic cell line without the loss of their capacity to differentiate. It is manifested by:

- Fatigue, weight loss, loss of energy
- Low-grade fever and excessive sweating
- Bleeding, petechiae, and ecchymosis due to disordered platelet function
- Left upper quadrant abdominal pain from spleen infarction
- Bone pain
- Splenomegaly
- Hepatomegaly
- WBC count 20,000-60,000 cells/µl
- Normochromic and normocytic anemia
- Platelet counts low, normal, or increased

CHECK ANSWER END SESSION NEXT

Session Statistics

Answered: 34 ✓ **Correct**: 6 ✕ **Incorrect**: 28 **Average Score**: 17.65 %



Question 36 of 102

Question Difficulty: **Hard**

8 year old boy was investigated after he bled excessively following a tooth extraction. Investigations show:

Platelets	220 K/mm3	(150-450 K/mm3)
PT	8	12-13 seconds
aPTT	65	30-50 seconds
Factor VIII	Normal	

Which of the following investigations would be needed?

- ○ **Factor IX**
- ● **Vitamin C level**
- ○ **INR**
- ○ **Bleeding time**
- ○ **Bone marrow biopsy**

- ○ **Factor IX**
- ● **Vitamin C level**
- ○ **INR**
- ○ **Bleeding time**
- ○ **Bone marrow biopsy**

Description

Hemophilia A, Hemophilia B and Von Willebrand disease are manifested by normal PT and prolonged aPTT. As Factor VIII level is normal.

Factor IX is needed to differentiate between Hemophilia B and Von Willebrand disease.

Question 37 of 102

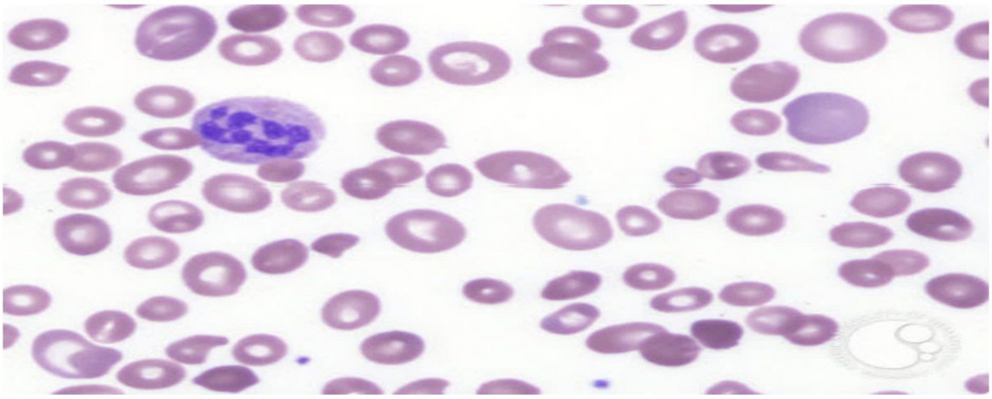
Question Difficulty: **Hard**

Mr. X is complaining of exertional dyspnea and chest pain for 2 months. He has a 6 months history of abdominal pain and vomiting.

Examination revealed pallor, patches of vitiligo on the arms and trunk and a palpable liver and spleen. Investigations show:

Leukocyte count	10 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	280 million/mm3	(150-450 million/mm3)
Erythrocyte count	4.1 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	9.2 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	105 fl	80-100 fl
Mean corpuscular hemoglobin	22 pg/cell	25.4-34.6 pg/cell

His blood film is shown in the image. Bone marrow aspiration shows hypercellular with erythroid hyperplasia with megaloblasts.



What is the most likely diagnosis?

○ **Sideroblastic anemia**

○ **Pernicious anemia**

● **Myelodysplasia**

○ **Autoimmune hemolytic anemia**

○ **Alcohol addiction**

Description

The investigations show megaloblastic anemia. Peripheral smear morphology shows macroovalocytes and hyper-segmented neutrophils.

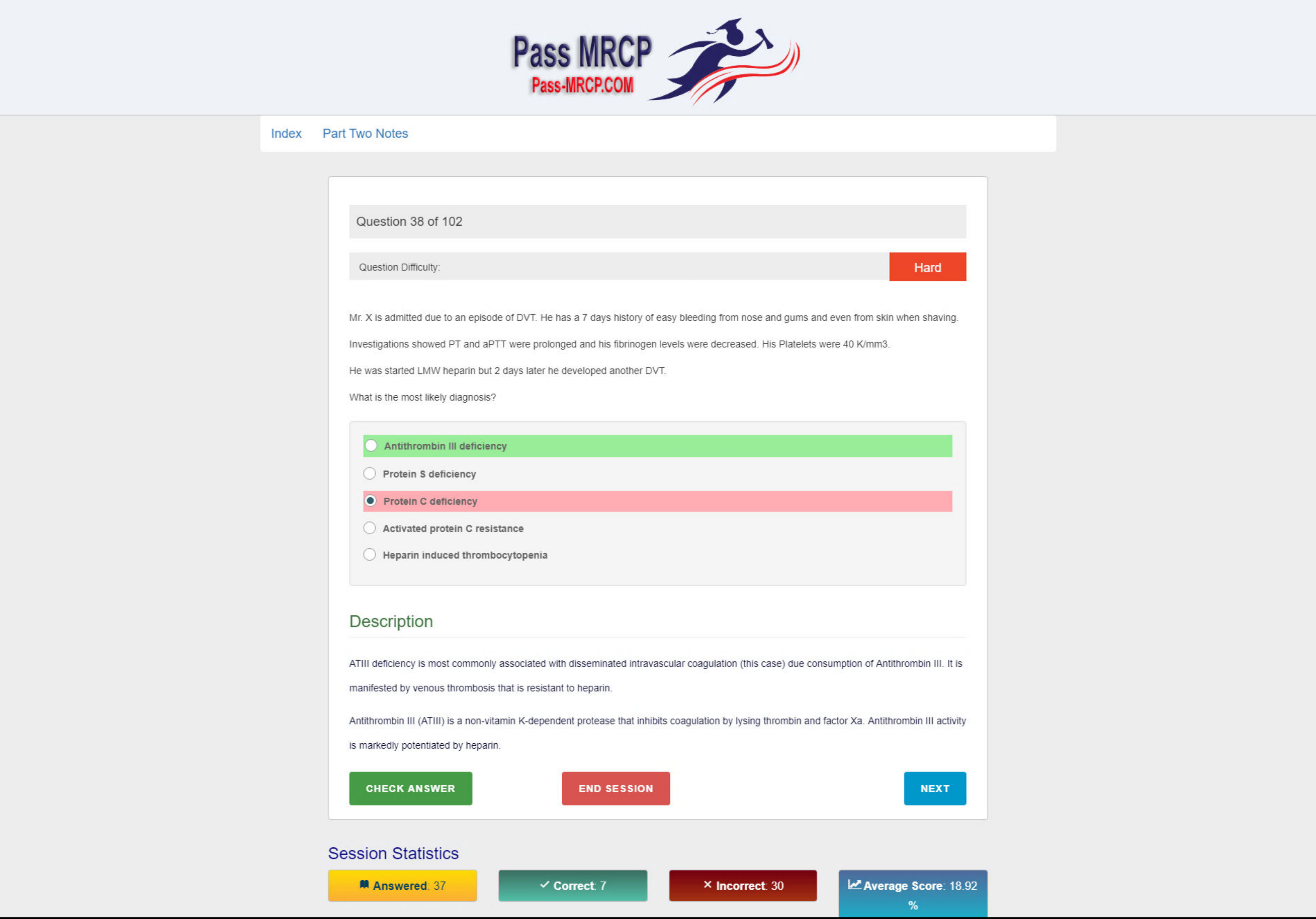
Causes of megaloblastic anemia with megaloblastic bone marrow

- Vitamin B12 deficiency
- Folate deficiency
- Cytotoxic drugs

CHECK ANSWER **END SESSION** **NEXT**

Session Statistics

Answered: 36
✓ **Correct**: 7
✕ **Incorrect**: 29
Average Score: 19.44 %



Question 38 of 102

Question Difficulty: **Hard**

Mr. X is admitted due to an episode of DVT. He has a 7 days history of easy bleeding from nose and gums and even from skin when shaving.

Investigations showed PT and aPTT were prolonged and his fibrinogen levels were decreased. His Platelets were 40 K/mm3.

He was started LMW heparin but 2 days later he developed another DVT.

What is the most likely diagnosis?

- ○ **Antithrombin III deficiency**
- ○ **Protein S deficiency**
- ● **Protein C deficiency**
- ○ **Activated protein C resistance**
- ○ **Heparin induced thrombocytopenia**

Description

ATIII deficiency is most commonly associated with disseminated intravascular coagulation (this case) due consumption of Antithrombin III. It is manifested by venous thrombosis that is resistant to heparin.

Antithrombin III (ATIII) is a non-vitamin K-dependent protease that inhibits coagulation by lysing thrombin and factor Xa. Antithrombin III activity is markedly potentiated by heparin.

Session Statistics

Answered: 37

✓ **Correct**: 7

✕ **Incorrect**: 30

Average Score: 18.92 %

Question 39 of 102

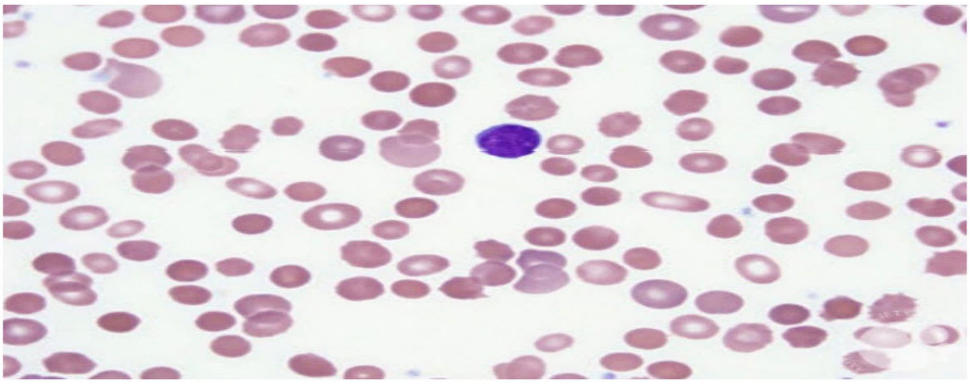
Question Difficulty: **Hard**

10 years old boy is complaining of continuous feeling of tired. He has a long history of gallstones and jaundice.

Examination showed pallor, splenomegaly and bilateral leg ulcer. Investigations showed:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	230 million/mm3	(150-450 million/mm3)
Erythrocyte count	3.5 million/mm3	Male: 4.3-5.9 million/mm3
Reticulocyte count	8%	0.5%-1.5%
Hemoglobin	11 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	88 fl	80-100 fl

Other investigations showed increased lactate dehydrogenase (LDH) level, increased indirect bilirubin and normal serum haptoglobin. Blood film is shown in the image.



What is the most likely diagnosis?

○ **Hereditary spherocytosis**

○ **Pyruvate kinase deficiency**

● **Paroxysmal nocturnal hemoglobinuria**

○ **Sickle-cell disease**

○ **Thalassemia**

Description

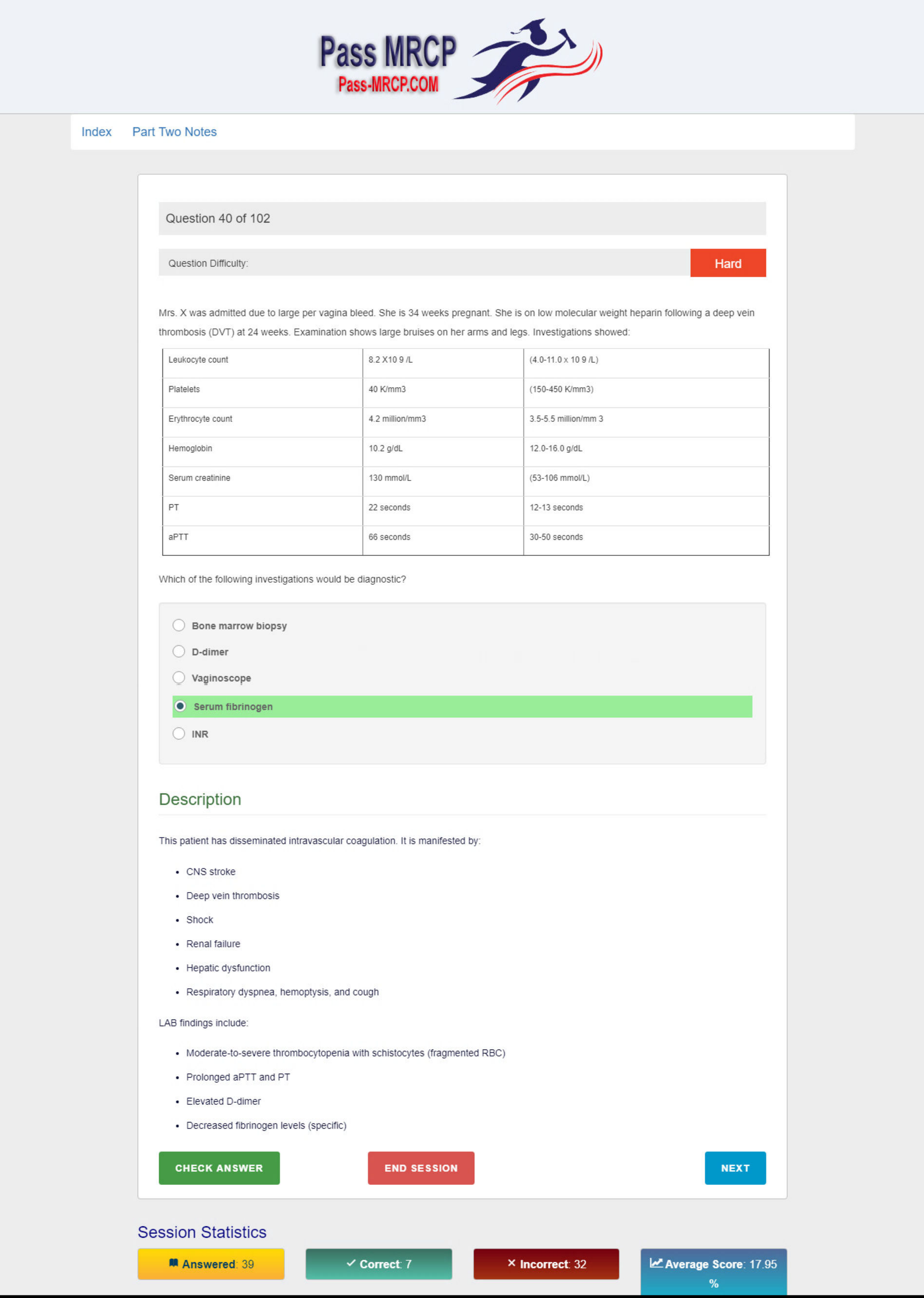
Hereditary spherocytosis is an autosomal dominant abnormality of erythrocytes caused by mutations in genes relating to RBC membrane proteins causing abnormal erythrocytes (spherocytosis) rather than the normal biconcave disk. It is manifested by

- Mild to moderate anemia
- Features of extravascular hemolytic anemia (reticulocytosis, hyperbilirubinemia with normal haptoglobin)
- Spherocytes on the peripheral blood smear
- Positive osmotic fragility test (diagnostic)

CHECK ANSWER END SESSION NEXT

Session Statistics

Answered: 38 ✓ **Correct**: 7 ✕ **Incorrect**: 31 **Average Score**: 18.42 %



Question 40 of 102

Question Difficulty: Hard

Mrs. X was admitted due to large per vagina bleed. She is 34 weeks pregnant. She is on low molecular weight heparin following a deep vein thrombosis (DVT) at 24 weeks. Examination shows large bruises on her arms and legs. Investigations showed:

Leukocyte count	8.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	40 K/mm3	(150-450 K/mm3)
Erythrocyte count	4.2 million/mm3	3.5-5.5 million/mm 3
Hemoglobin	10.2 g/dL	12.0-16.0 g/dL
Serum creatinine	130 mmol/L	(53-106 mmol/L)
PT	22 seconds	12-13 seconds
aPTT	66 seconds	30-50 seconds

Which of the following investigations would be diagnostic?

○ **Bone marrow biopsy**
○ **D-dimer**
○ **Vaginoscope**
● **Serum fibrinogen**
○ **INR**

Description

This patient has disseminated intravascular coagulation. It is manifested by:

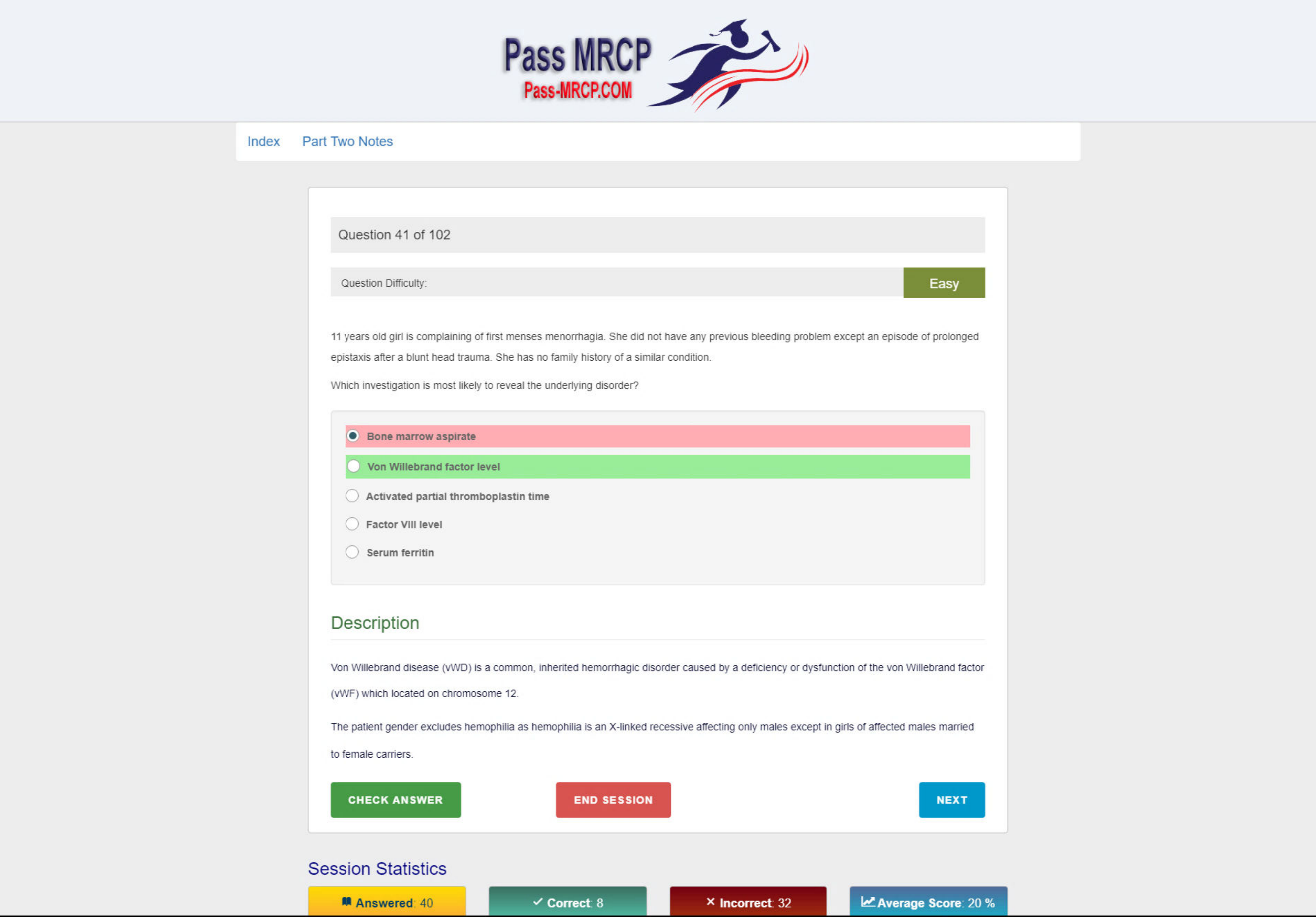
- CNS stroke
- Deep vein thrombosis
- Shock
- Renal failure
- Hepatic dysfunction
- Respiratory dyspnea, hemoptysis, and cough

LAB findings include:

- Moderate-to-severe thrombocytopenia with schistocytes (fragmented RBC)
- Prolonged aPTT and PT
- Elevated D-dimer
- Decreased fibrinogen levels (specific)

Session Statistics

Answered: 39
✓ **Correct**: 7
× **Incorrect**: 32
Average Score: 17.95 %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Part Two Notes

Question 41 of 102

Question Difficulty: **Easy**

11 years old girl is complaining of first menses menorrhagia. She did not have any previous bleeding problem except an episode of prolonged epistaxis after a blunt head trauma. She has no family history of a similar condition.

Which investigation is most likely to reveal the underlying disorder?

- ● **Bone marrow aspirate**
- ○ **Von Willebrand factor level**
- ○ **Activated partial thromboplastin time**
- ○ **Factor VIII level**
- ○ **Serum ferritin**

Description

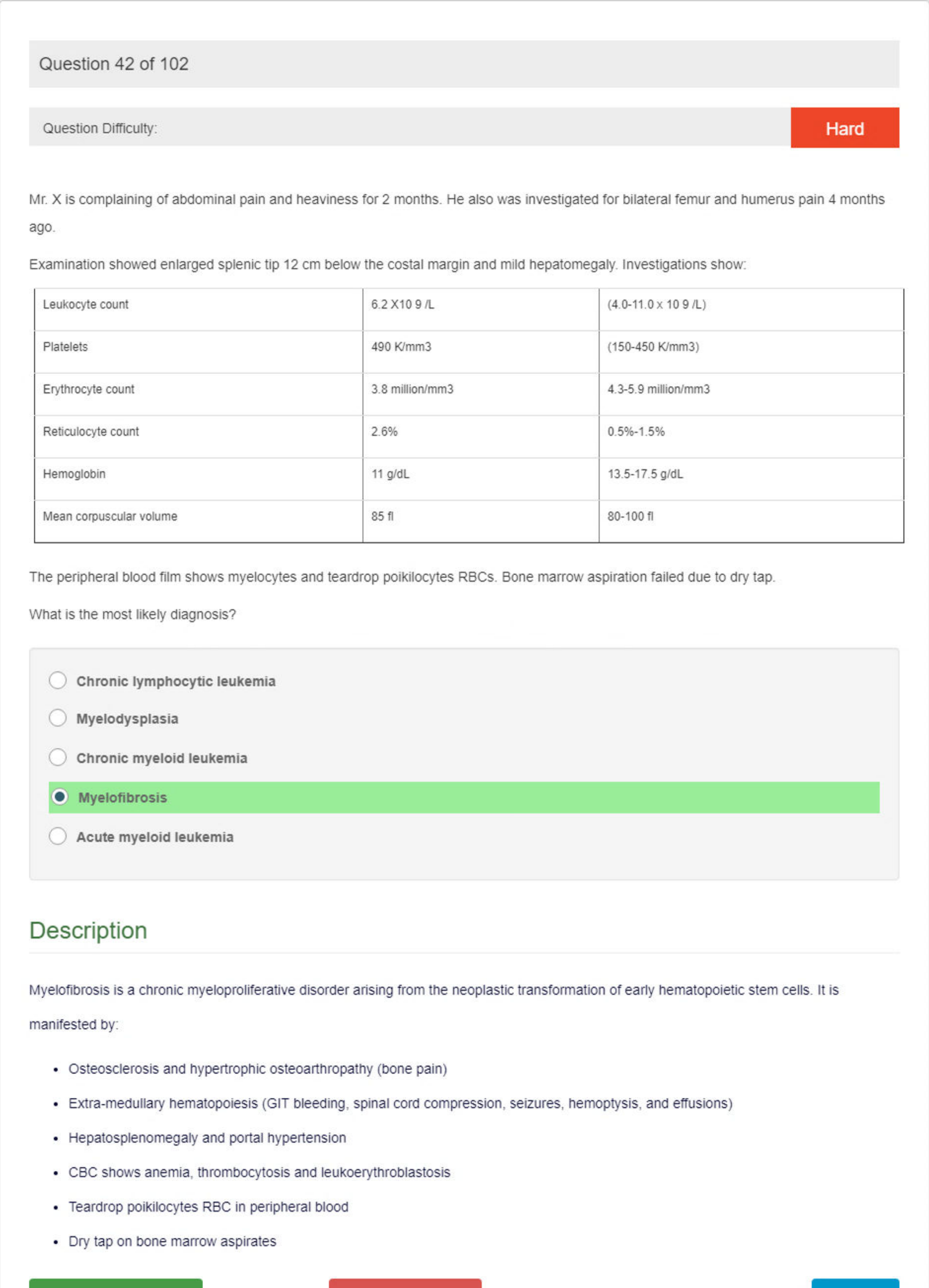
Von Willebrand disease (vWD) is a common, inherited hemorrhagic disorder caused by a deficiency or dysfunction of the von Willebrand factor (vWF) which located on chromosome 12.

The patient gender excludes hemophilia as hemophilia is an X-linked recessive affecting only males except in girls of affected males married to female carriers.

CHECK ANSWER
END SESSION
NEXT

Session Statistics

Answered: 40
Correct: 8
Incorrect: 32
Average Score: 20 %



Question 42 of 102

Question Difficulty: **Hard**

Mr. X is complaining of abdominal pain and heaviness for 2 months. He also was investigated for bilateral femur and humerus pain 4 months ago.

Examination showed enlarged splenic tip 12 cm below the costal margin and mild hepatomegaly. Investigations show:

Leukocyte count	6.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	490 K/mm3	(150-450 K/mm3)
Erythrocyte count	3.8 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	2.6%	0.5%-1.5%
Hemoglobin	11 g/dL	13.5-17.5 g/dL
Mean corpuscular volume	85 fl	80-100 fl

The peripheral blood film shows myelocytes and teardrop poikilocytes RBCs. Bone marrow aspiration failed due to dry tap.

What is the most likely diagnosis?

○ **Chronic lymphocytic leukemia**
○ **Myelodysplasia**
○ **Chronic myeloid leukemia**
● **Myelofibrosis**
○ **Acute myeloid leukemia**

Description

Myelofibrosis is a chronic myeloproliferative disorder arising from the neoplastic transformation of early hematopoietic stem cells. It is manifested by:

- Osteosclerosis and hypertrophic osteoarthropathy (bone pain)
- Extra-medullary hematopoiesis (GIT bleeding, spinal cord compression, seizures, hemoptysis, and effusions)
- Hepatosplenomegaly and portal hypertension
- CBC shows anemia, thrombocytosis and leukoerythroblastosis
- Teardrop poikilocytes RBC in peripheral blood
- Dry tap on bone marrow aspirates

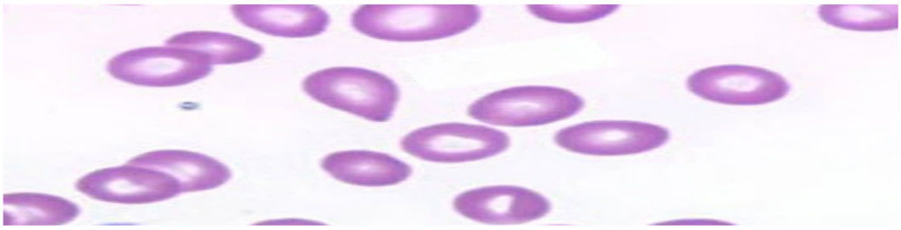
Question 43 of 102

Question Difficulty: **Hard**

Mr. X is complaining of with lethargy and bone pain for 2 months. He was investigated Hepatosplenomegaly 4 months ago. Investigations show:

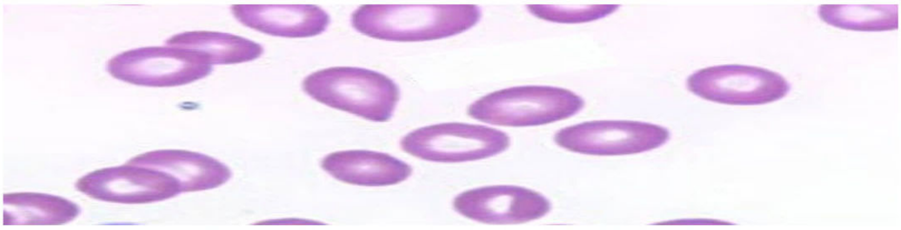
Leukocyte count	6.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	490 K/mm3	(150-450 K/mm3)
Erythrocyte count	3.8 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	2.6%	0.5%-1.5%

The peripheral blood film is shown in the image.



Which of the following investigations is diagnostic?

The peripheral blood film is shown in the image.



Which of the following investigations is diagnostic?

○ **Bone marrow aspiration**

○ **B12 level**

○ **Erythropoietin levels**

○ **Bone marrow biopsy**

● **Ferritin level**

Description

This patient has myelofibrosis. It is a chronic myeloproliferative disorder arising from the neoplastic transformation of early hematopoietic stem cells. It is manifested by:

- Osteosclerosis and hypertrophic osteoarthropathy (bone pain)
- Extra-medullary hematopoiesis (GIT bleeding, spinal cord compression, seizures, hemoptysis, and effusions)
- Hepatosplenomegaly and portal hypertension
- CBC shows anemia, thrombocytosis and leukoerythroblastosis
- Teardrop poikilocytes RBC shown in the image
- Dry tap on bone marrow aspirates

Bone marrow biopsy is diagnostic; it shows hypercellular marrow with increased megakaryocytes and reticular fibrosis.

CHECK ANSWER **END SESSION** **NEXT**

Session Statistics

Answered: 42

✓ **Correct**: 9

✕ **Incorrect**: 33

Average Score: 21.43 %

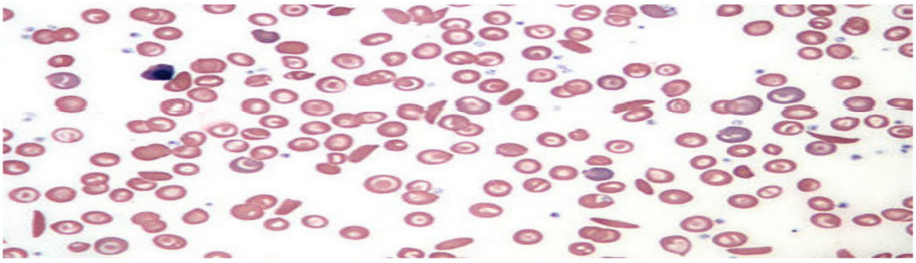
Question 44 of 102

Question Difficulty: **Hard**

15 Years old boy was admitted due to 12 hour of priapism. He has a recent history of intermittent back and abdominal pain. He had cholecystomy 2 years previously due to recurrent gall stones.

Examination showed he looks anemic. There is frontal bossing of the skull and bilateral leg ulcers. He has an enlarged smooth liver and a painful engorged penis. Blood film is shown in the image. Investigations show:

Leukocyte count	9 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	460 million/mm3	(150-450 million/mm3)
Erythrocyte count	3.5 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	6.7 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	78 fl	80-100 fl
Mean corpuscular hemoglobin	16 pg/cell	25.4-34.6 pg/cell
Serum iron	34 µmol/L	Male 11.6–31.7 µmol/L



What is the most likely diagnosis?

○ **Acute myeloid leukemia**

○ **Sickle cell anemia**

○ **Autoimmune hemolytic anemia**

○ **Beta thalassemia major**

● **Alfa thalassemia major**

Description

Sickle cell disease (SCD) is an autosomal recessive disorder resulting from the presence of a mutated form of hemoglobin called hemoglobin S (HbS). It is manifested by:

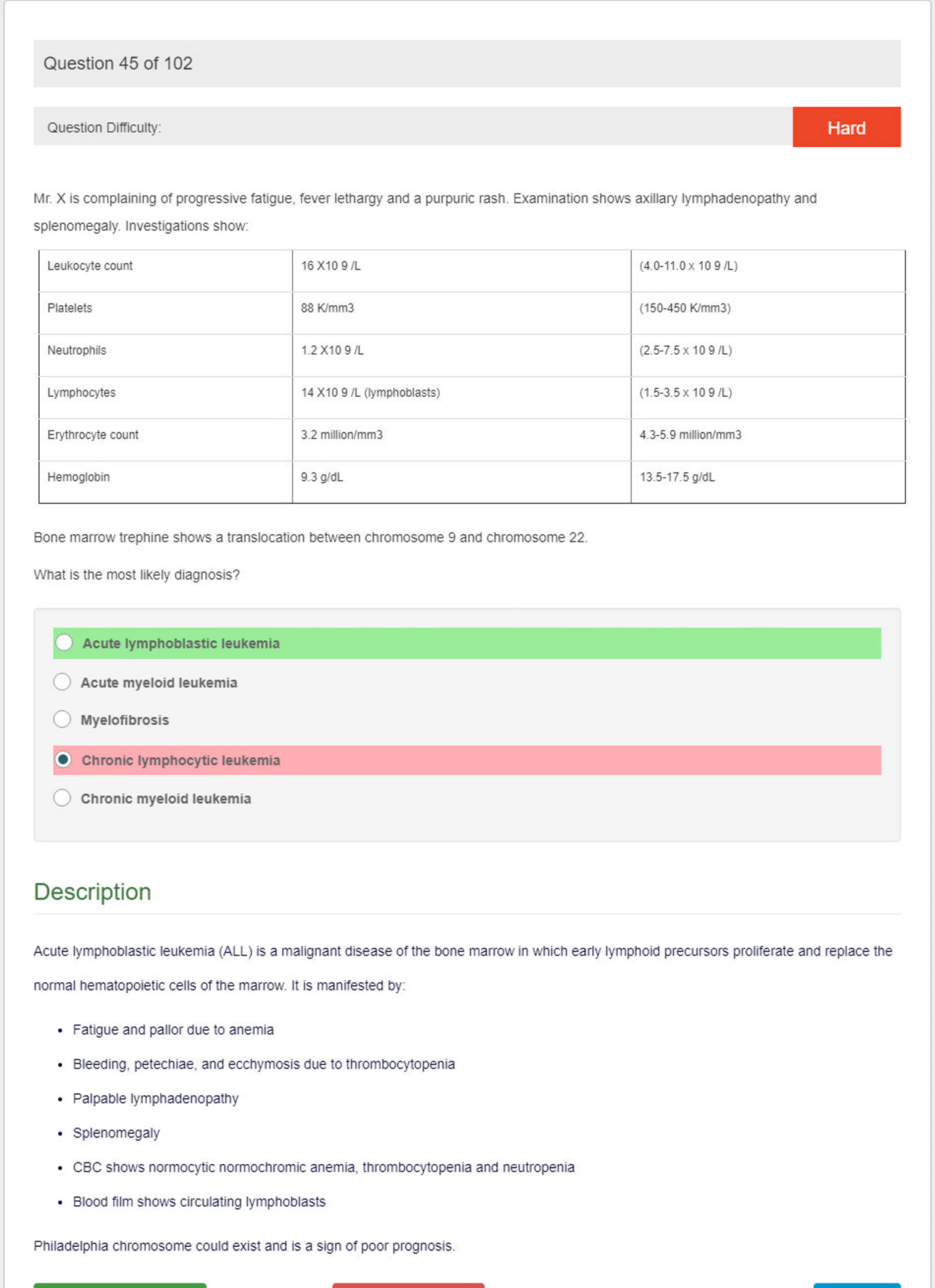
- Growth retardation
- Repeated infections with encapsulated organisms
- Hand-foot syndrome (Dactylitis and arthritis)
- Priapism
- CNS strokes
- Cholelithiasis
- Leg ulcers

Complete blood count shows hemoglobin levels in the range of 6-8 g/dl with a high reticulocyte count and blood film shows target cells and atypical sickle cells (Drepanocytes).

CHECK ANSWER END SESSION NEXT

Session Statistics

Answered: 43 ✓ **Correct**: 9 ✕ **Incorrect**: 34 **Average Score**: 20.93 %



Question 45 of 102

Question Difficulty: **Hard**

Mr. X is complaining of progressive fatigue, fever lethargy and a purpuric rash. Examination shows axillary lymphadenopathy and splenomegaly. Investigations show:

Leukocyte count	16 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	88 K/mm3	(150-450 K/mm3)
Neutrophils	1.2 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	14 X10 9 /L (lymphoblasts)	(1.5-3.5 x 10 9 /L)
Erythrocyte count	3.2 million/mm3	4.3-5.9 million/mm3
Hemoglobin	9.3 g/dL	13.5-17.5 g/dL

Bone marrow trephine shows a translocation between chromosome 9 and chromosome 22.

What is the most likely diagnosis?

○ **Acute lymphoblastic leukemia**
○ **Acute myeloid leukemia**
○ **Myelofibrosis**
● **Chronic lymphocytic leukemia**
○ **Chronic myeloid leukemia**

Description

Acute lymphoblastic leukemia (ALL) is a malignant disease of the bone marrow in which early lymphoid precursors proliferate and replace the normal hematopoietic cells of the marrow. It is manifested by:

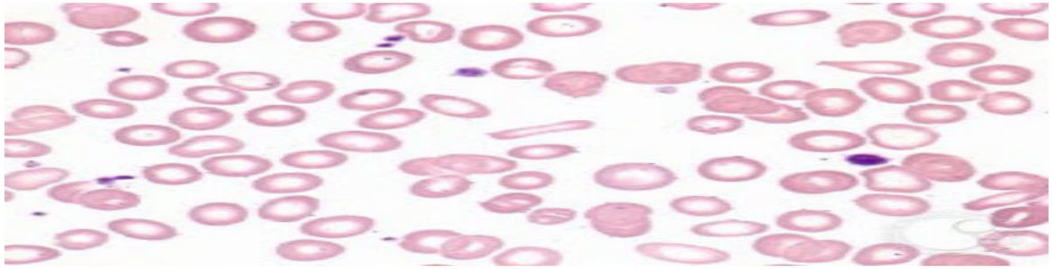
- Fatigue and pallor due to anemia
- Bleeding, petechiae, and ecchymosis due to thrombocytopenia
- Palpable lymphadenopathy
- Splenomegaly
- CBC shows normocytic normochromic anemia, thrombocytopenia and neutropenia
- Blood film shows circulating lymphoblasts

Philadelphia chromosome could exist and is a sign of poor prognosis.

Question 46 of 102

Question Difficulty: **Hard**

Mr. X is complaining of increasing shortness of breath associated with chest pain. Examination showed conjunctival pallor, spoon-shaped nails and angular stomatitis. His blood film is shown in the image .



What is the most likely diagnosis?

○ **Folate-deficiency anemia**

● **Anemia of chronic disease**

○ **Autoimmune hemolytic anemia**

○ **Iron-deficiency anemia**

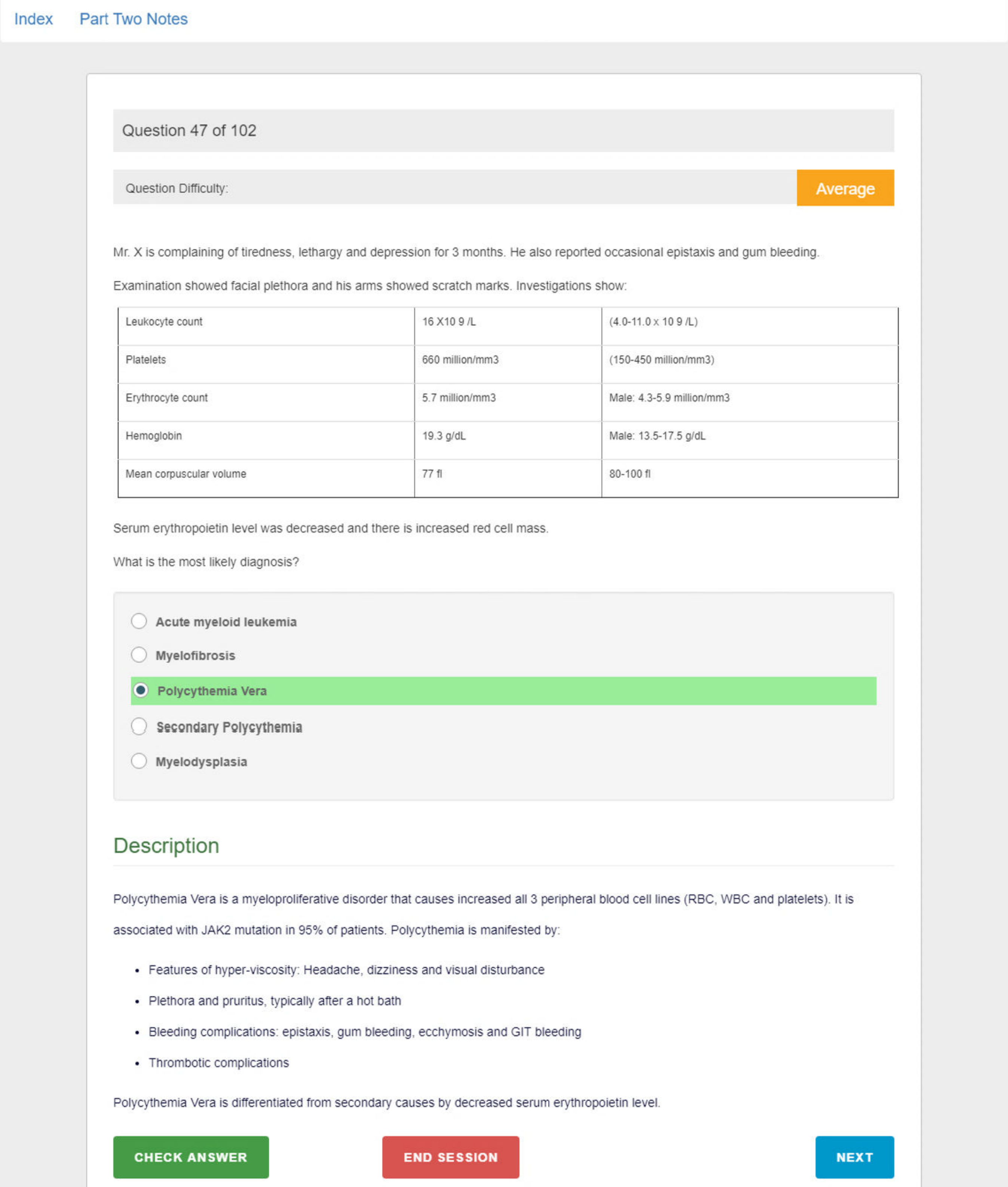
○ **Microangiopathic hemolytic anemia**

Description

Iron deficiency anemia is manifested by:

- Pallor of the mucous membranes
- Myocardial ischemia
- Cold intolerance
- Esophageal webbing and gastric atrophy
- Koilonychia (spoon-shaped nails)
- Glossitis
- Angular stomatitis
- Low serum iron and ferritin (storage protein) levels with elevated transferrin (transporting protein) and total iron-binding capacity (serum iron and serum iron-binding protein levels TIBC) and decreased transferrin saturation (serum iron divided by total iron-binding capacity)

The blood film showed microcytic (decreased mean corpuscular volume (MCV) and hypochromic (decreased mean corpuscular hemoglobin concentration (MCHC) RBCs.



Question 47 of 102

Question Difficulty: **Average**

Mr. X is complaining of tiredness, lethargy and depression for 3 months. He also reported occasional epistaxis and gum bleeding.

Examination showed facial plethora and his arms showed scratch marks. Investigations show:

Leukocyte count	16 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	660 million/mm3	(150-450 million/mm3)
Erythrocyte count	5.7 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	19.3 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	77 fl	80-100 fl

Serum erythropoietin level was decreased and there is increased red cell mass.

What is the most likely diagnosis?

○ **Acute myeloid leukemia**

○ **Myelofibrosis**

● **Polycythemia Vera**

○ **Secondary Polycythemia**

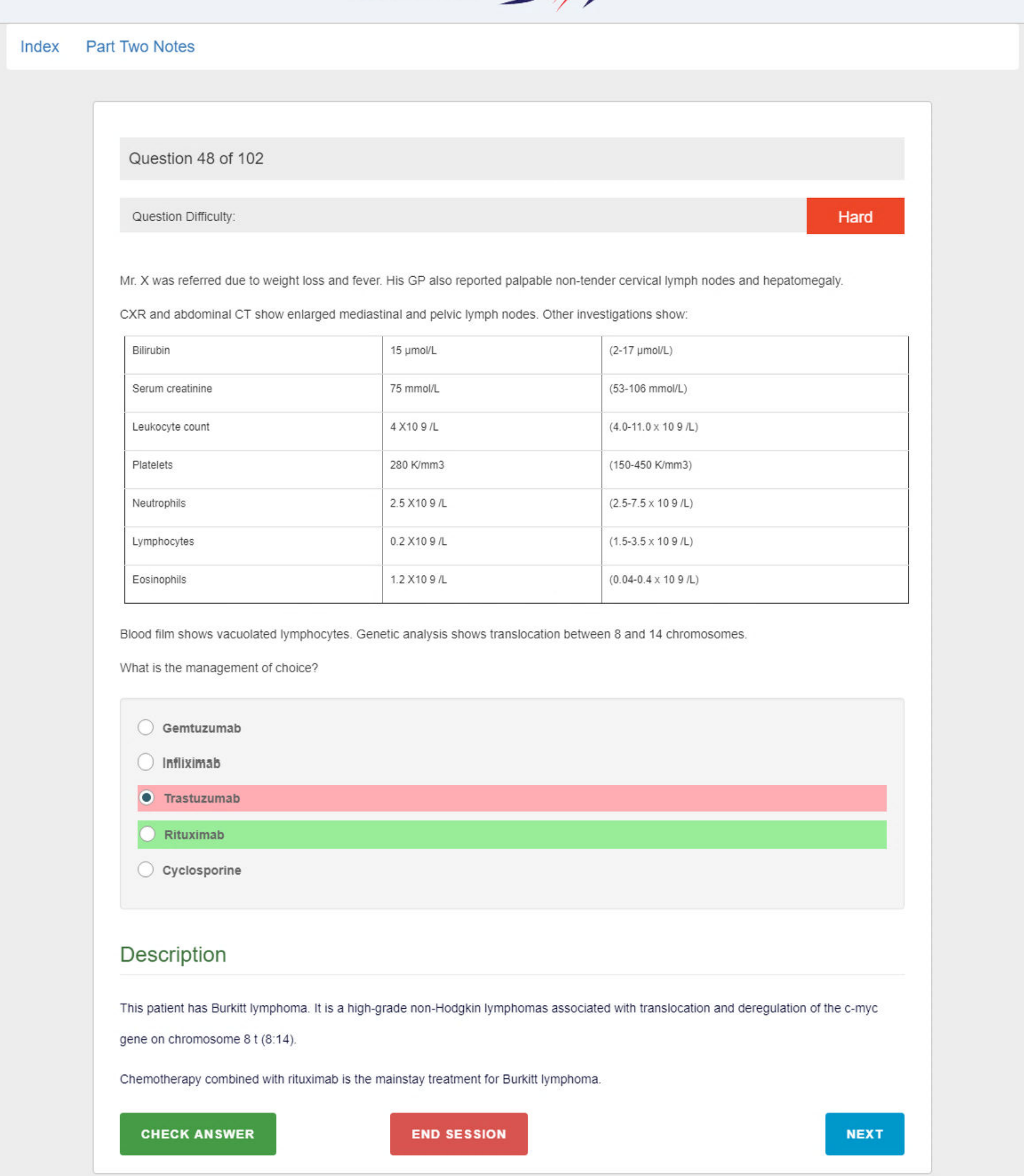
○ **Myelodysplasia**

Description

Polycythemia Vera is a myeloproliferative disorder that causes increased all 3 peripheral blood cell lines (RBC, WBC and platelets). It is associated with JAK2 mutation in 95% of patients. Polycythemia is manifested by:

- Features of hyper-viscosity: Headache, dizziness and visual disturbance
- Plethora and pruritus, typically after a hot bath
- Bleeding complications: epistaxis, gum bleeding, ecchymosis and GIT bleeding
- Thrombotic complications

Polycythemia Vera is differentiated from secondary causes by decreased serum erythropoietin level.



Question 48 of 102

Question Difficulty: **Hard**

Mr. X was referred due to weight loss and fever. His GP also reported palpable non-tender cervical lymph nodes and hepatomegaly.

CXR and abdominal CT show enlarged mediastinal and pelvic lymph nodes. Other investigations show:

Bilirubin	15 µmol/L	(2-17 µmol/L)
Serum creatinine	75 mmol/L	(53-106 mmol/L)
Leukocyte count	4 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	280 K/mm3	(150-450 K/mm3)
Neutrophils	2.5 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	0.2 X10 9 /L	(1.5-3.5 x 10 9 /L)
Eosinophils	1.2 X10 9 /L	(0.04-0.4 x 10 9 /L)

Blood film shows vacuolated lymphocytes. Genetic analysis shows translocation between 8 and 14 chromosomes.

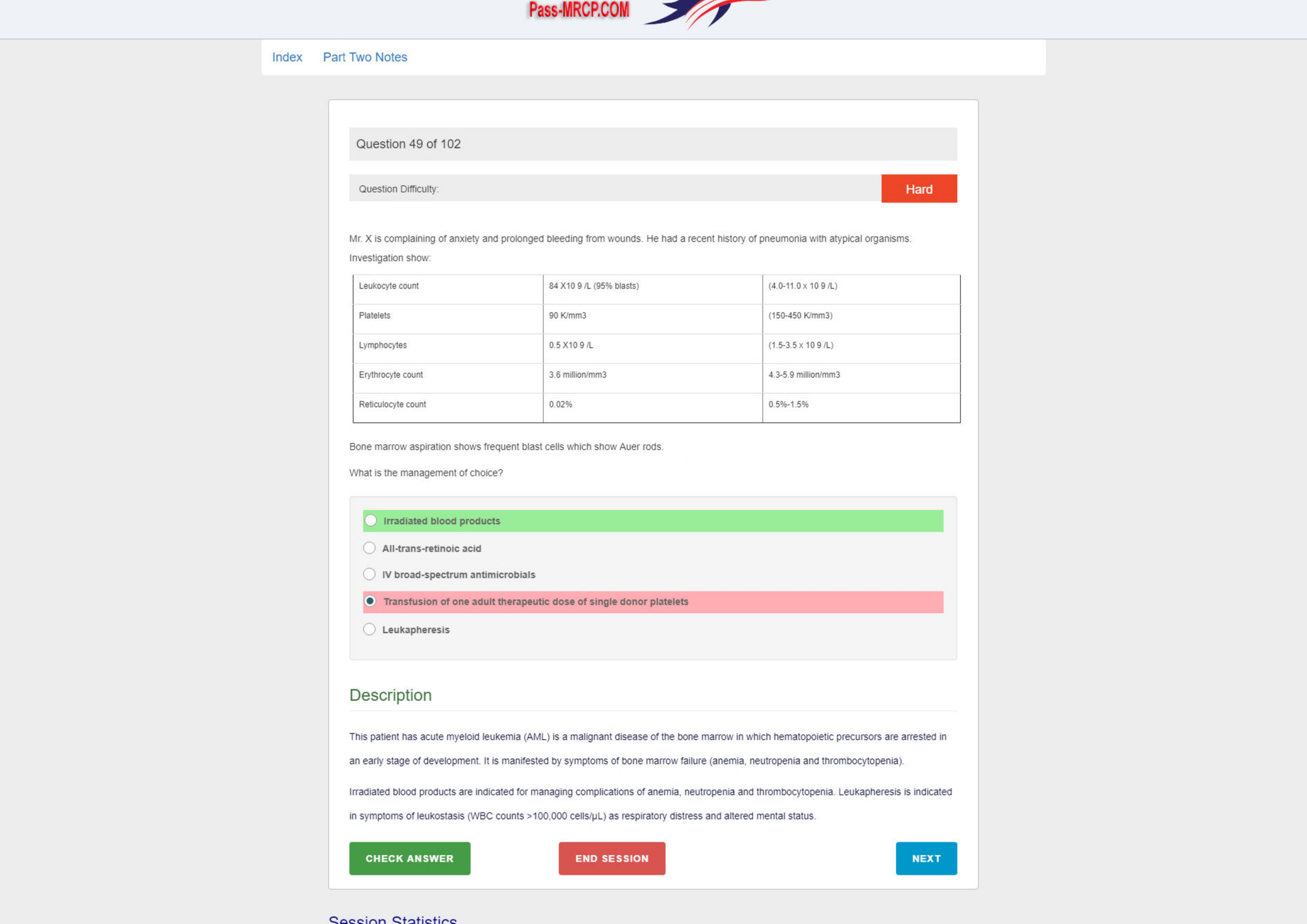
What is the management of choice?

- ○ **Gemtuzumab**
- ○ **Infliximab**
- ● **Trastuzumab**
- ○ **Rituximab**
- ○ **Cyclosporine**

Description

This patient has Burkitt lymphoma. It is a high-grade non-Hodgkin lymphomas associated with translocation and deregulation of the c-myc gene on chromosome 8 t (8:14).

Chemotherapy combined with rituximab is the mainstay treatment for Burkitt lymphoma.



Question 49 of 102

Question Difficulty: **Hard**

Mr. X is complaining of anxiety and prolonged bleeding from wounds. He had a recent history of pneumonia with atypical organisms.

Investigation show:

Leukocyte count	84 X10 9 /L (95% blasts)	(4.0-11.0 x 10 9 /L)
Platelets	90 K/mm3	(150-450 K/mm3)
Lymphocytes	0.5 X10 9 /L	(1.5-3.5 x 10 9 /L)
Erythrocyte count	3.6 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	0.02%	0.5%-1.5%

Bone marrow aspiration shows frequent blast cells which show Auer rods.

What is the management of choice?

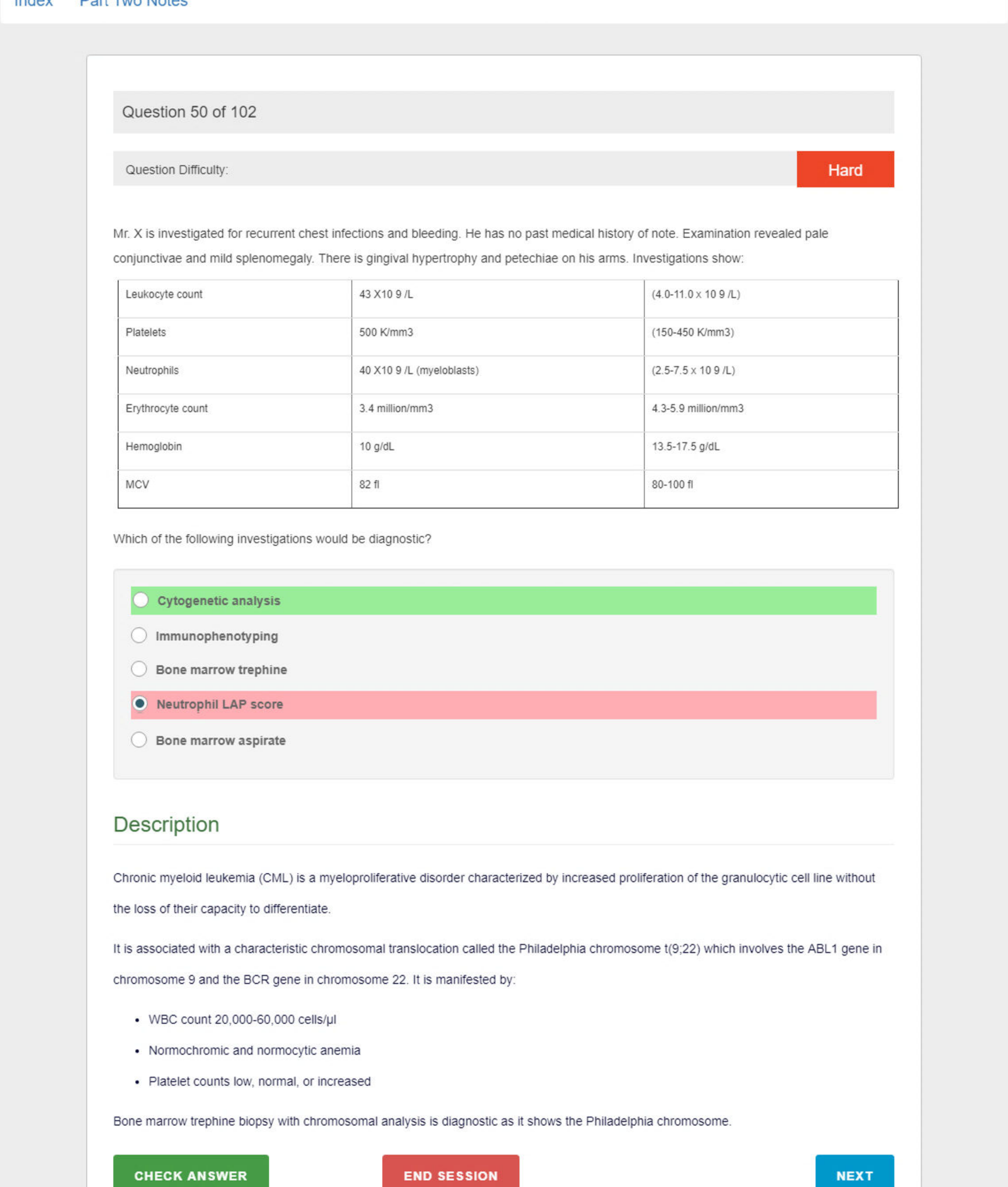
- ○ **Irradiated blood products**
- ○ **All-trans-retinoic acid**
- ○ **IV broad-spectrum antimicrobials**
- ● **Transfusion of one adult therapeutic dose of single donor platelets**
- ○ **Leukapheresis**

Description

This patient has acute myeloid leukemia (AML) is a malignant disease of the bone marrow in which hematopoietic precursors are arrested in an early stage of development. It is manifested by symptoms of bone marrow failure (anemia, neutropenia and thrombocytopenia).

Irradiated blood products are indicated for managing complications of anemia, neutropenia and thrombocytopenia. Leukapheresis is indicated in symptoms of leukostasis (WBC counts >100,000 cells/µL) as respiratory distress and altered mental status.

Session Statistics



Question 50 of 102

Question Difficulty: **Hard**

Mr. X is investigated for recurrent chest infections and bleeding. He has no past medical history of note. Examination revealed pale conjunctivae and mild splenomegaly. There is gingival hypertrophy and petechiae on his arms. Investigations show:

Leukocyte count	43 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	500 K/mm3	(150-450 K/mm3)
Neutrophils	40 X10 9 /L (myeloblasts)	(2.5-7.5 x 10 9 /L)
Erythrocyte count	3.4 million/mm3	4.3-5.9 million/mm3
Hemoglobin	10 g/dL	13.5-17.5 g/dL
MCV	82 fl	80-100 fl

Which of the following investigations would be diagnostic?

○ **Cytogenetic analysis**
○ **Immunophenotyping**
○ **Bone marrow trephine**
● **Neutrophil LAP score**
○ **Bone marrow aspirate**

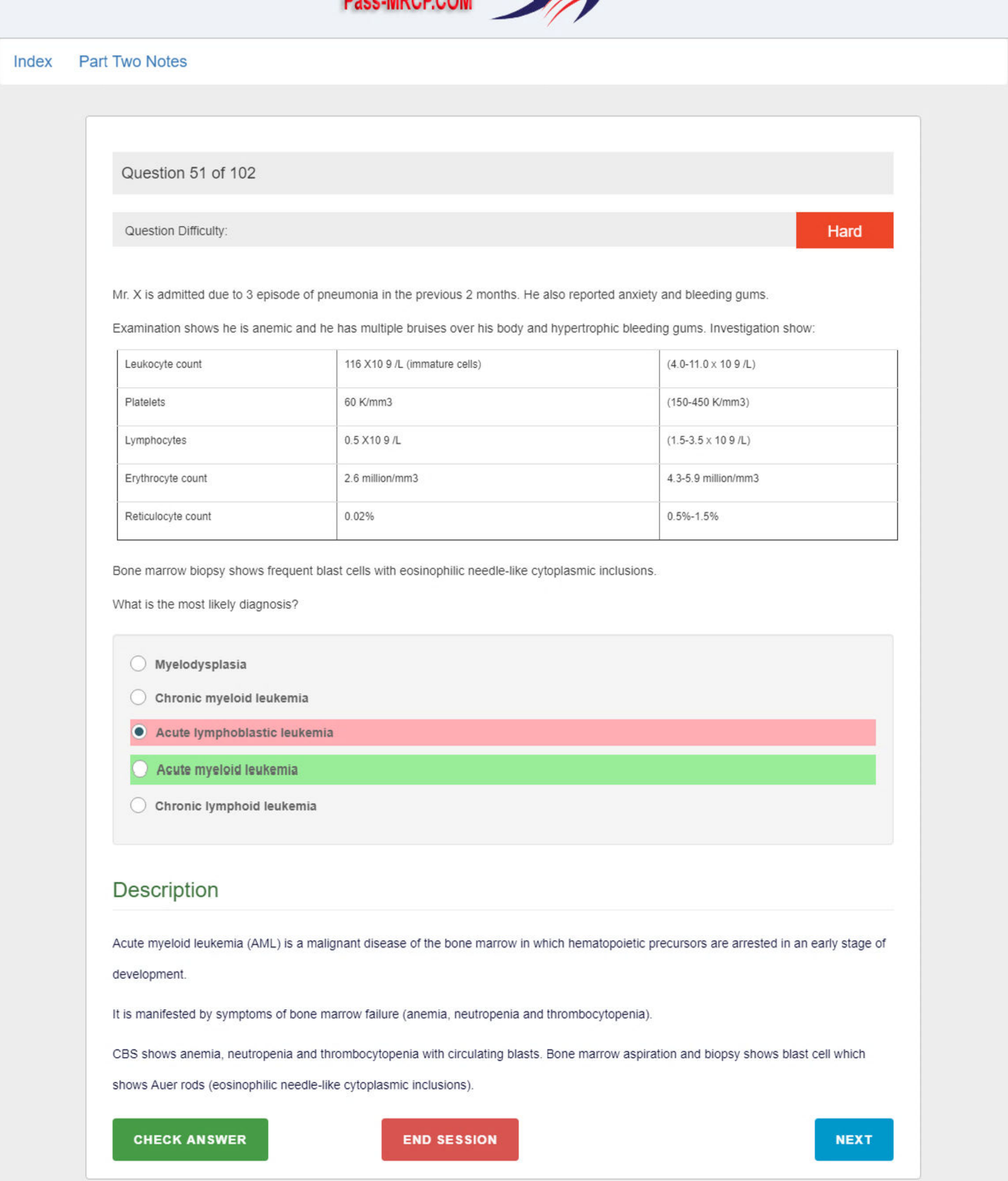
Description

Chronic myeloid leukemia (CML) is a myeloproliferative disorder characterized by increased proliferation of the granulocytic cell line without the loss of their capacity to differentiate.

It is associated with a characteristic chromosomal translocation called the Philadelphia chromosome t(9;22) which involves the ABL1 gene in chromosome 9 and the BCR gene in chromosome 22. It is manifested by:

- WBC count 20,000-60,000 cells/µl
- Normochromic and normocytic anemia
- Platelet counts low, normal, or increased

Bone marrow trephine biopsy with chromosomal analysis is diagnostic as it shows the Philadelphia chromosome.



Question 51 of 102

Question Difficulty: **Hard**

Mr. X is admitted due to 3 episode of pneumonia in the previous 2 months. He also reported anxiety and bleeding gums.

Examination shows he is anemic and he has multiple bruises over his body and hypertrophic bleeding gums. Investigation show:

Leukocyte count	116 X10 9 /L (immature cells)	(4.0-11.0 x 10 9 /L)
Platelets	60 K/mm3	(150-450 K/mm3)
Lymphocytes	0.5 X10 9 /L	(1.5-3.5 x 10 9 /L)
Erythrocyte count	2.6 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	0.02%	0.5%-1.5%

Bone marrow biopsy shows frequent blast cells with eosinophilic needle-like cytoplasmic inclusions.

What is the most likely diagnosis?

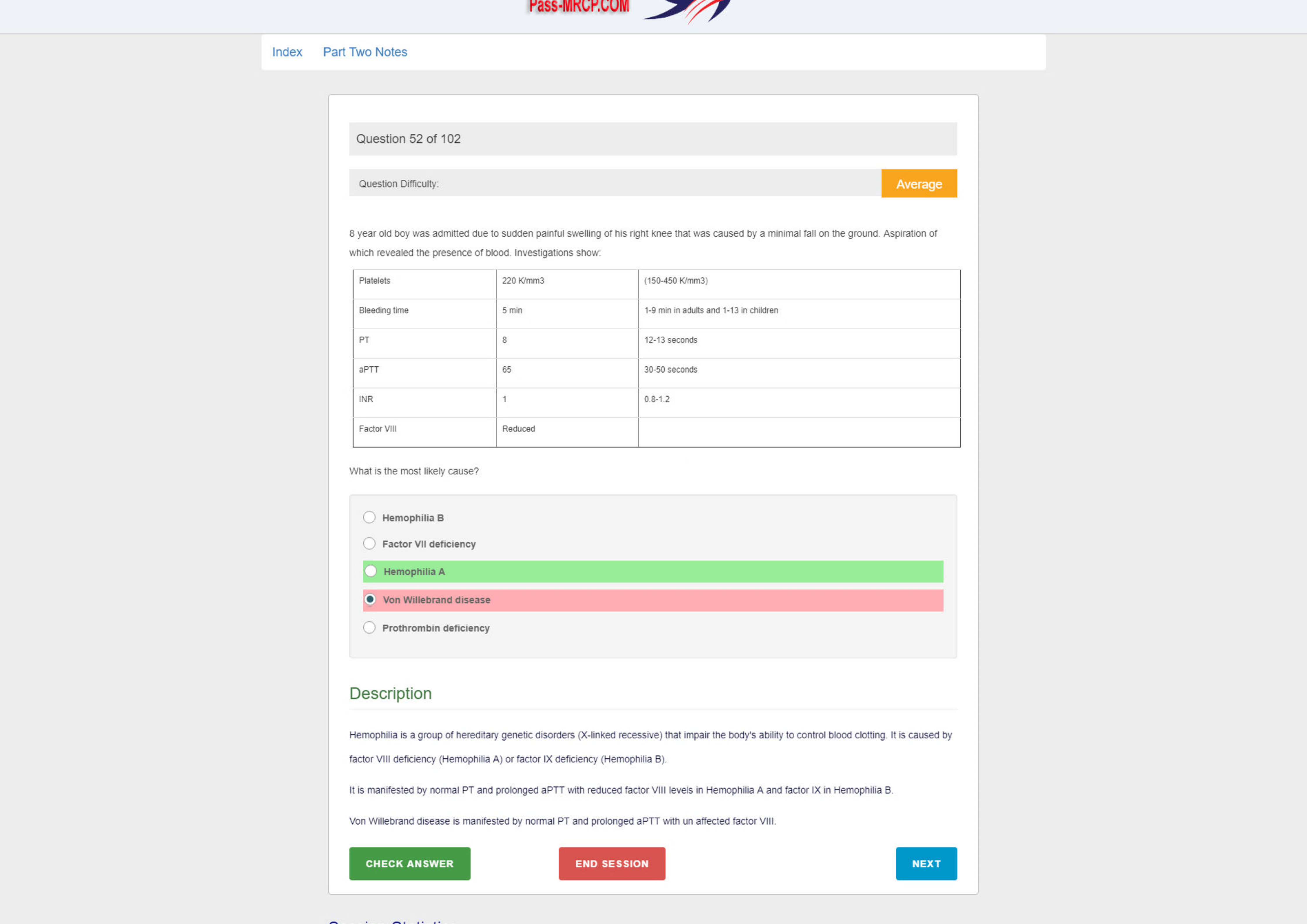
- ○ **Myelodysplasia**
- ○ **Chronic myeloid leukemia**
- ● **Acute lymphoblastic leukemia**
- ○ **Acute myeloid leukemia**
- ○ **Chronic lymphoid leukemia**

Description

Acute myeloid leukemia (AML) is a malignant disease of the bone marrow in which hematopoietic precursors are arrested in an early stage of development.

It is manifested by symptoms of bone marrow failure (anemia, neutropenia and thrombocytopenia).

CBS shows anemia, neutropenia and thrombocytopenia with circulating blasts. Bone marrow aspiration and biopsy shows blast cell which shows Auer rods (eosinophilic needle-like cytoplasmic inclusions).



Question 52 of 102

Question Difficulty: **Average**

8 year old boy was admitted due to sudden painful swelling of his right knee that was caused by a minimal fall on the ground. Aspiration of which revealed the presence of blood. Investigations show:

Platelets	220 K/mm3	(150-450 K/mm3)
Bleeding time	5 min	1-9 min in adults and 1-13 in children
PT	8	12-13 seconds
aPTT	65	30-50 seconds
INR	1	0.8-1.2
Factor VIII	Reduced	

What is the most likely cause?

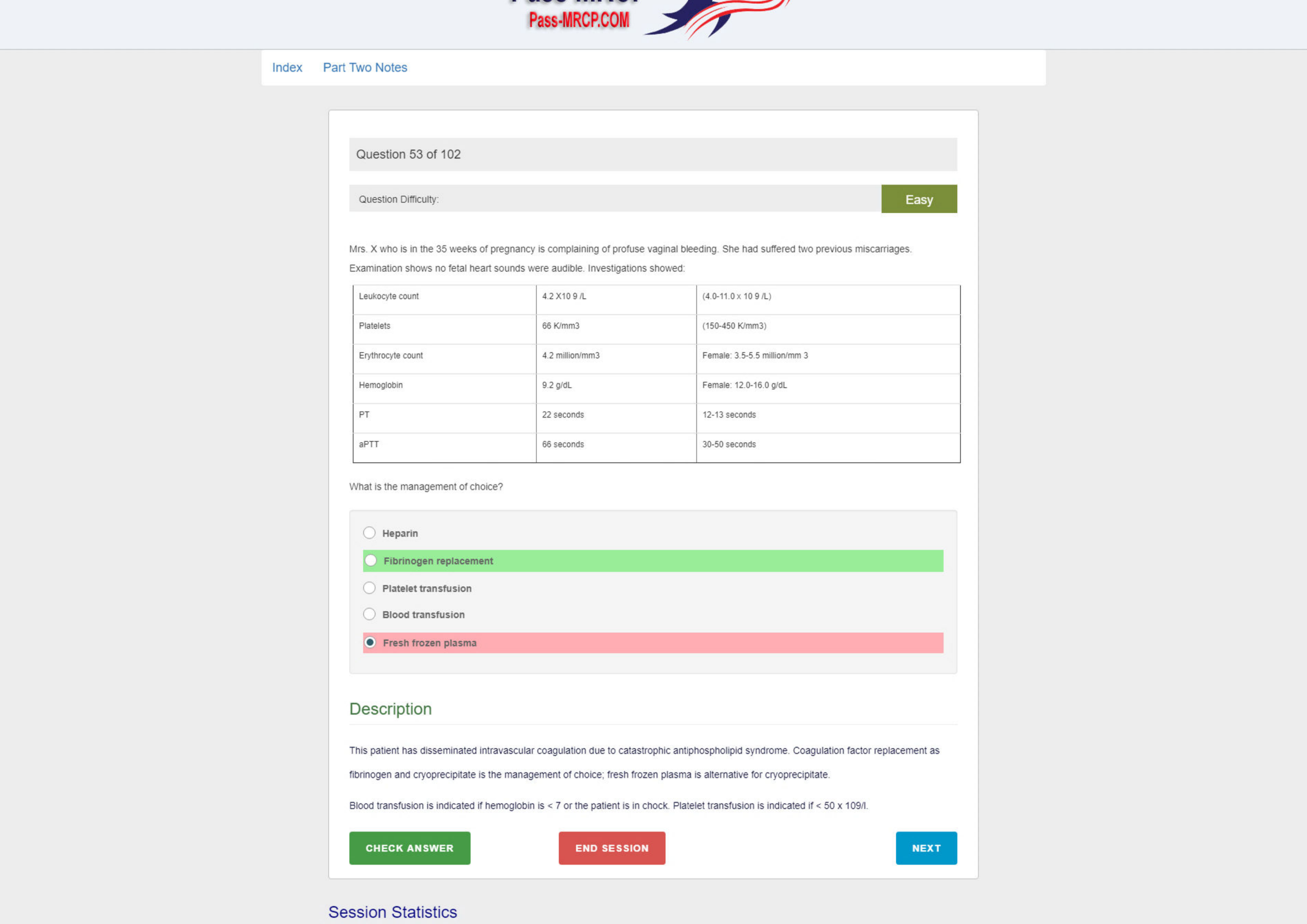
- ○ **Hemophilia B**
- ○ **Factor VII deficiency**
- ○ **Hemophilia A**
- ● **Von Willebrand disease**
- ○ **Prothrombin deficiency**

Description

Hemophilia is a group of hereditary genetic disorders (X-linked recessive) that impair the body's ability to control blood clotting. It is caused by factor VIII deficiency (Hemophilia A) or factor IX deficiency (Hemophilia B).

It is manifested by normal PT and prolonged aPTT with reduced factor VIII levels in Hemophilia A and factor IX in Hemophilia B.

Von Willebrand disease is manifested by normal PT and prolonged aPTT with un affected factor VIII.



Question 53 of 102

Question Difficulty: **Easy**

Mrs. X who is in the 35 weeks of pregnancy is complaining of profuse vaginal bleeding. She had suffered two previous miscarriages. Examination shows no fetal heart sounds were audible. Investigations showed:

Leukocyte count	4.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	66 K/mm3	(150-450 K/mm3)
Erythrocyte count	4.2 million/mm3	Female: 3.5-5.5 million/mm 3
Hemoglobin	9.2 g/dL	Female: 12.0-16.0 g/dL
PT	22 seconds	12-13 seconds
aPTT	66 seconds	30-50 seconds

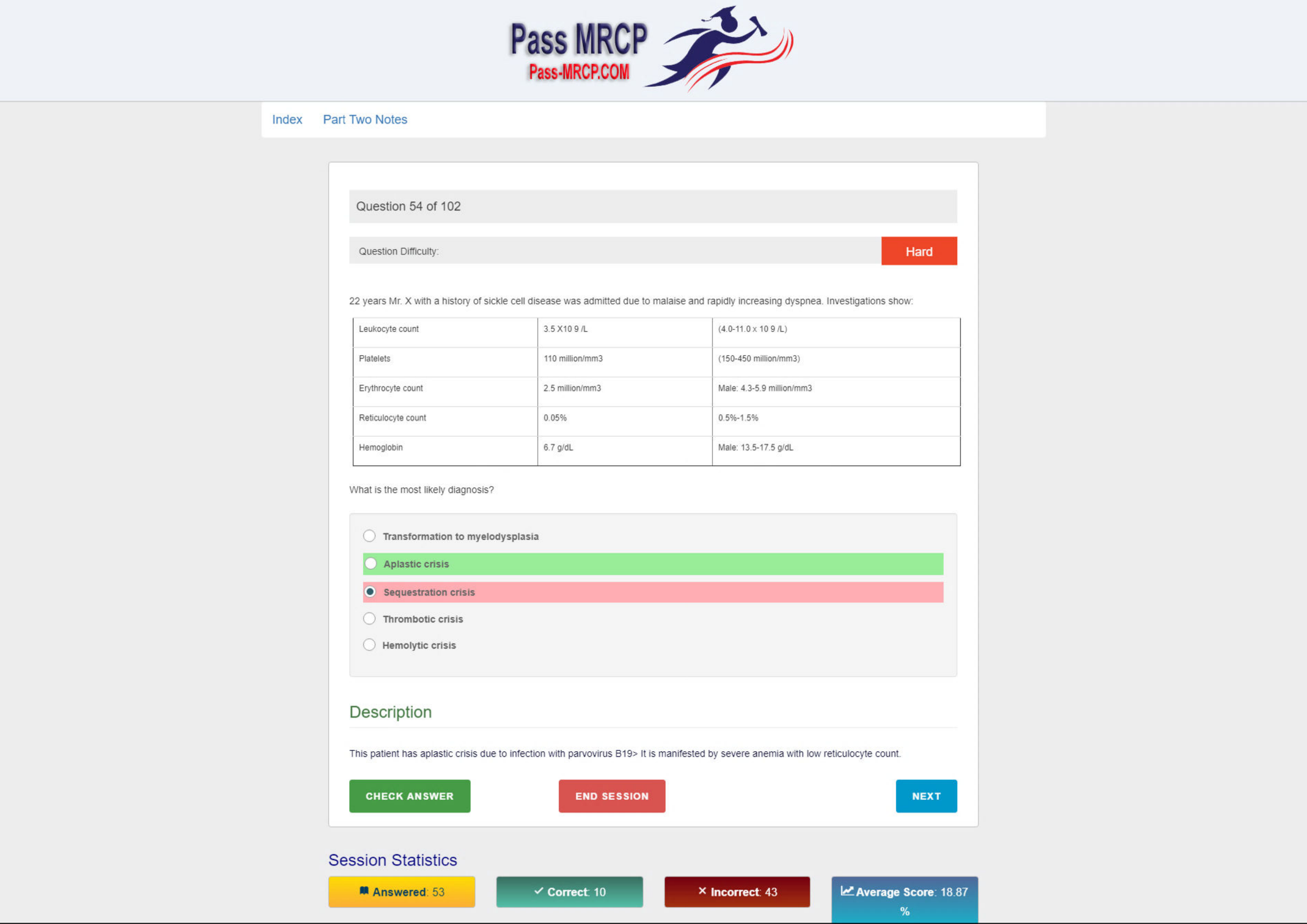
What is the management of choice?

- ○ **Heparin**
- ○ **Fibrinogen replacement**
- ○ **Platelet transfusion**
- ○ **Blood transfusion**
- ● **Fresh frozen plasma**

Description

This patient has disseminated intravascular coagulation due to catastrophic antiphospholipid syndrome. Coagulation factor replacement as fibrinogen and cryoprecipitate is the management of choice; fresh frozen plasma is alternative for cryoprecipitate.

Blood transfusion is indicated if hemoglobin is < 7 or the patient is in chock. Platelet transfusion is indicated if < 50 x 109/l.



Question 54 of 102

Question Difficulty: Hard

22 years Mr. X with a history of sickle cell disease was admitted due to malaise and rapidly increasing dyspnea. Investigations show:

Leukocyte count	3.5 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	110 million/mm3	(150-450 million/mm3)
Erythrocyte count	2.5 million/mm3	Male: 4.3-5.9 million/mm3
Reticulocyte count	0.05%	0.5%-1.5%
Hemoglobin	6.7 g/dL	Male: 13.5-17.5 g/dL

What is the most likely diagnosis?

- ○ **Transformation to myelodysplasia**
- ○ **Aplastic crisis**
- ● **Sequestration crisis**
- ○ **Thrombotic crisis**
- ○ **Hemolytic crisis**

Description

This patient has aplastic crisis due to infection with parvovirus B19> It is manifested by severe anemia with low reticulocyte count.

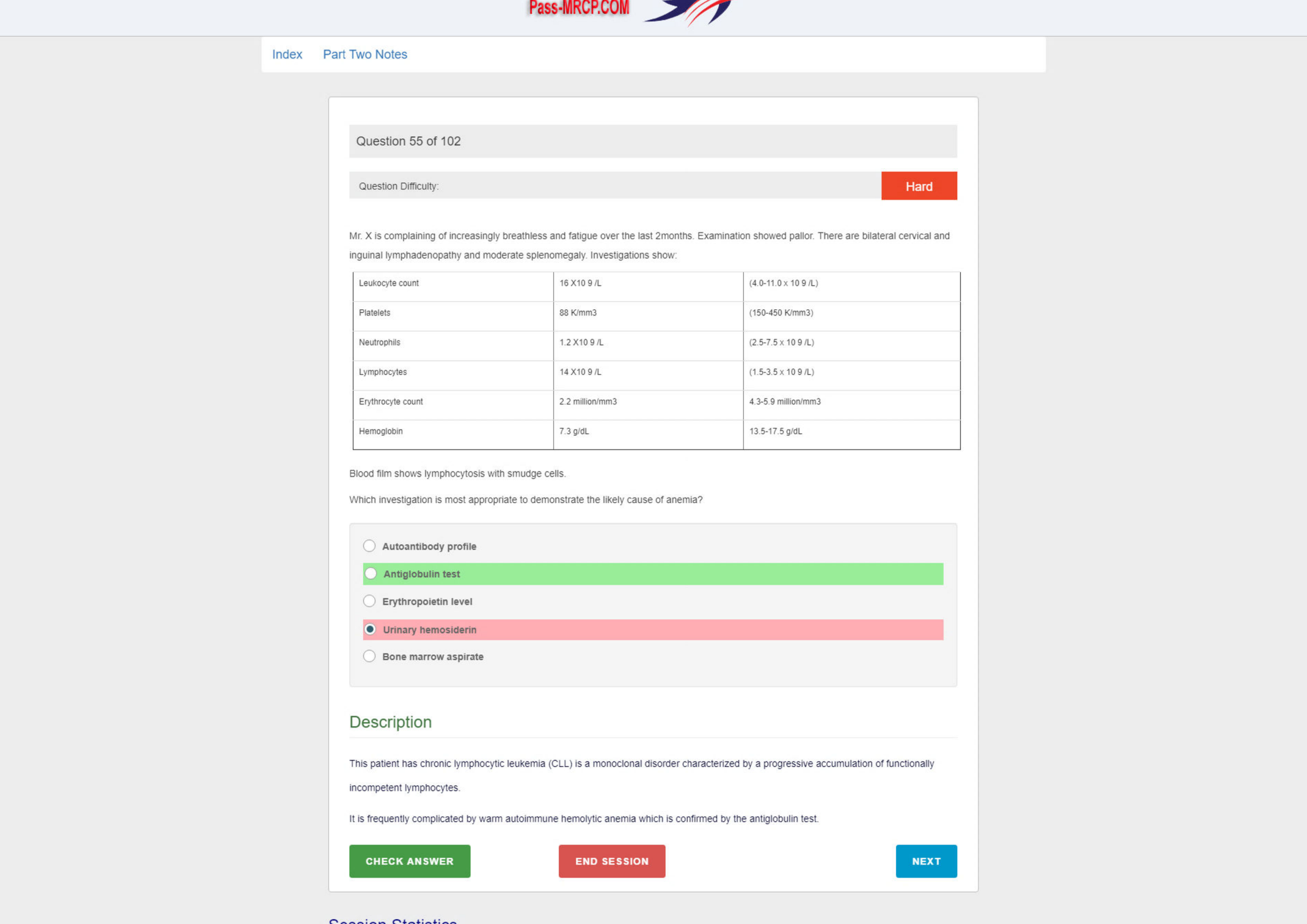
Session Statistics

Answered: 53

Correct: 10

Incorrect: 43

Average Score: 18.87 %



Question 55 of 102

Question Difficulty: **Hard**

Mr. X is complaining of increasingly breathless and fatigue over the last 2months. Examination showed pallor. There are bilateral cervical and inguinal lymphadenopathy and moderate splenomegaly. Investigations show:

Leukocyte count	16 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	88 K/mm3	(150-450 K/mm3)
Neutrophils	1.2 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	14 X10 9 /L	(1.5-3.5 x 10 9 /L)
Erythrocyte count	2.2 million/mm3	4.3-5.9 million/mm3
Hemoglobin	7.3 g/dL	13.5-17.5 g/dL

Blood film shows lymphocytosis with smudge cells.

Which investigation is most appropriate to demonstrate the likely cause of anemia?

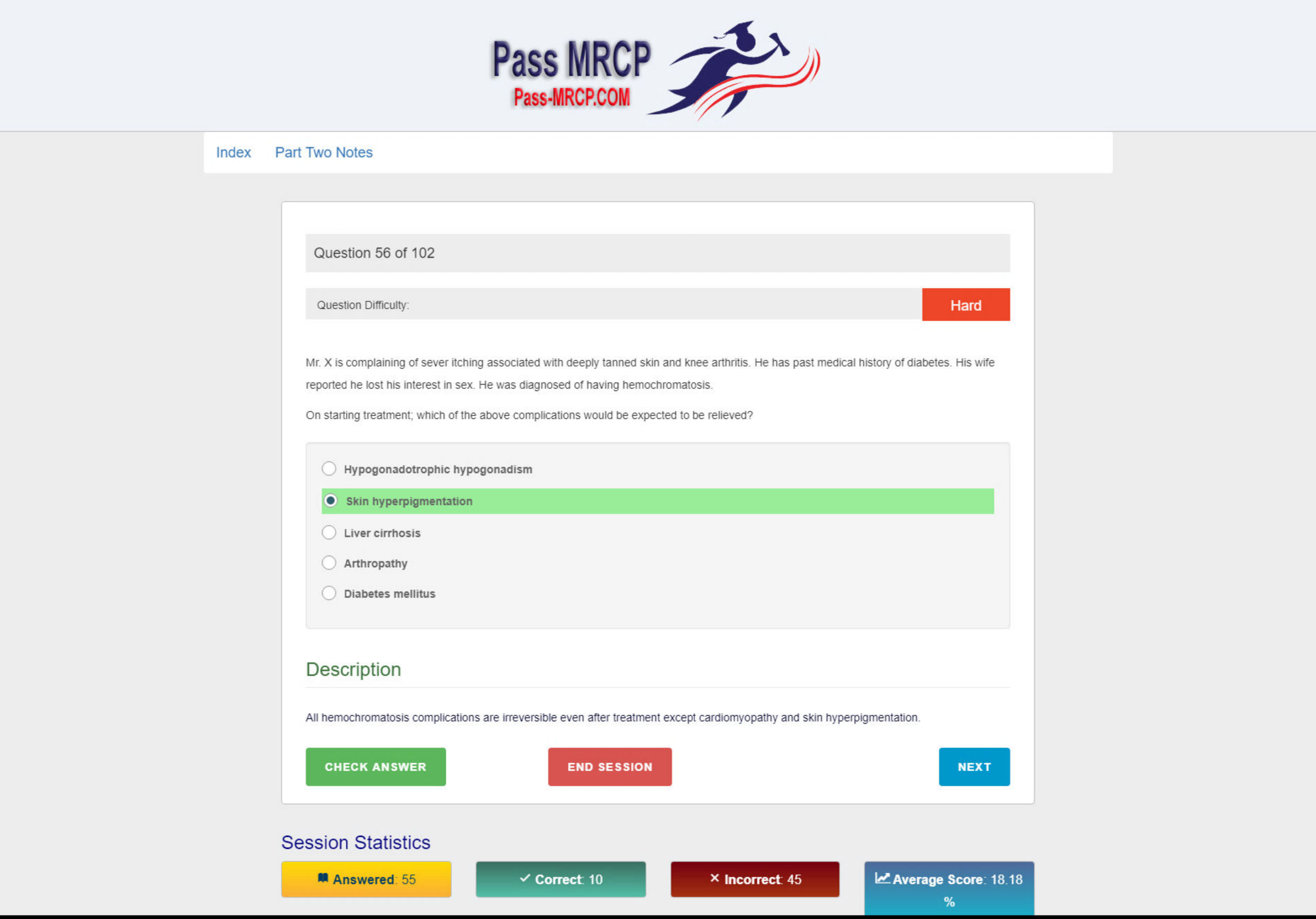
- ○ **Autoantibody profile**
- ○ **Antiglobulin test**
- ○ **Erythropoietin level**
- ● **Urinary hemosiderin**
- ○ **Bone marrow aspirate**

Description

This patient has chronic lymphocytic leukemia (CLL) is a monoclonal disorder characterized by a progressive accumulation of functionally incompetent lymphocytes.

It is frequently complicated by warm autoimmune hemolytic anemia which is confirmed by the antiglobulin test.

Session Statistics



Question 56 of 102

Question Difficulty: Hard

Mr. X is complaining of sever itching associated with deeply tanned skin and knee arthritis. He has past medical history of diabetes. His wife reported he lost his interest in sex. He was diagnosed of having hemochromatosis.

On starting treatment; which of the above complications would be expected to be relieved?

- ○ Hypogonadotrophic hypogonadism
- ● Skin hyperpigmentation
- ○ Liver cirrhosis
- ○ Arthropathy
- ○ Diabetes mellitus

Description

All hemochromatosis complications are irreversible even after treatment except cardiomyopathy and skin hyperpigmentation.

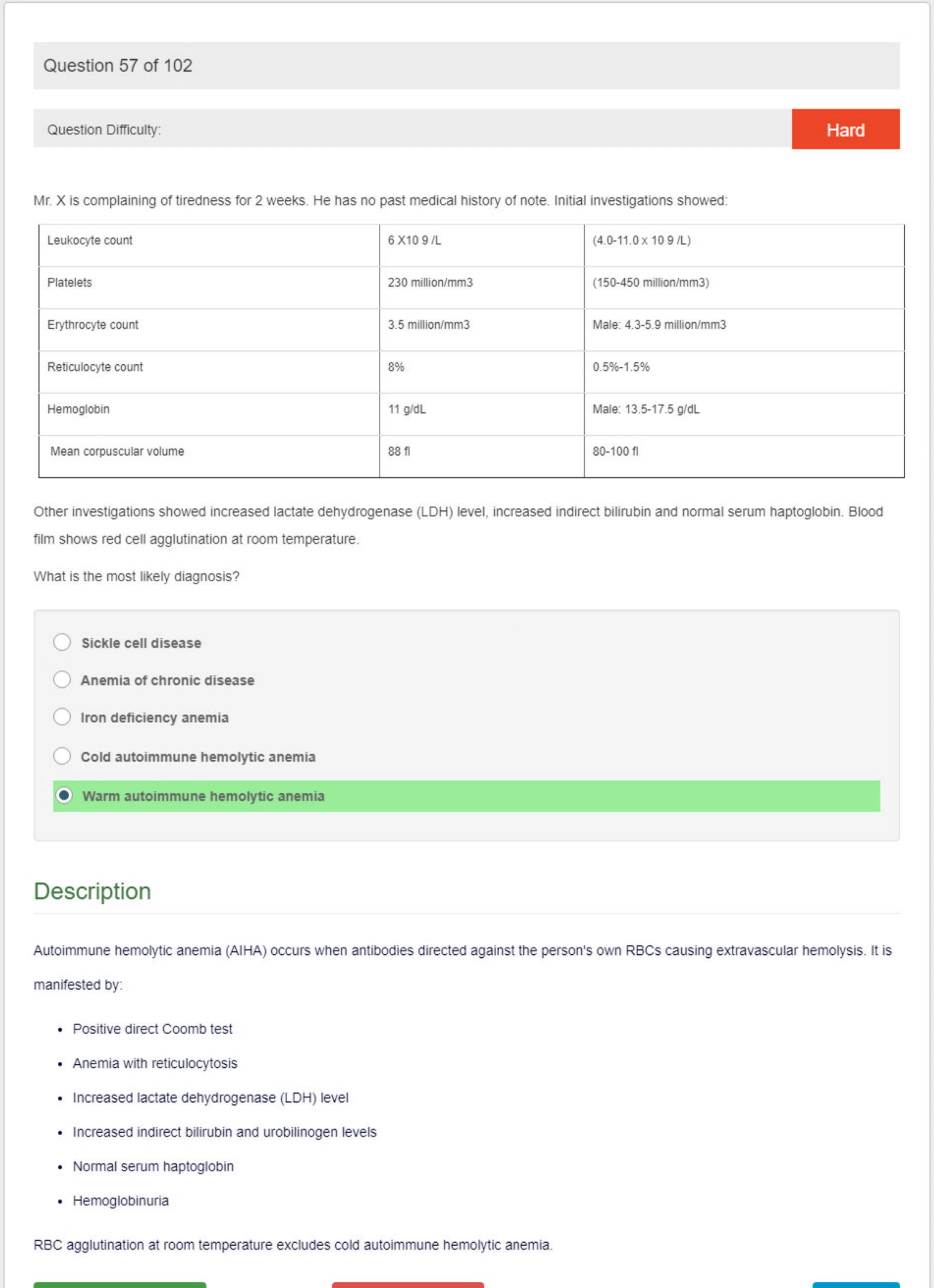
Session Statistics

Answered: 55

✓ Correct: 10

× Incorrect: 45

Average Score: 18.18 %



Question 57 of 102

Question Difficulty:

Mr. X is complaining of tiredness for 2 weeks. He has no past medical history of note. Initial investigations showed:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	230 million/mm3	(150-450 million/mm3)
Erythrocyte count	3.5 million/mm3	Male: 4.3-5.9 million/mm3
Reticulocyte count	8%	0.5%-1.5%
Hemoglobin	11 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	88 fl	80-100 fl

Other investigations showed increased lactate dehydrogenase (LDH) level, increased indirect bilirubin and normal serum haptoglobin. Blood film shows red cell agglutination at room temperature.

What is the most likely diagnosis?

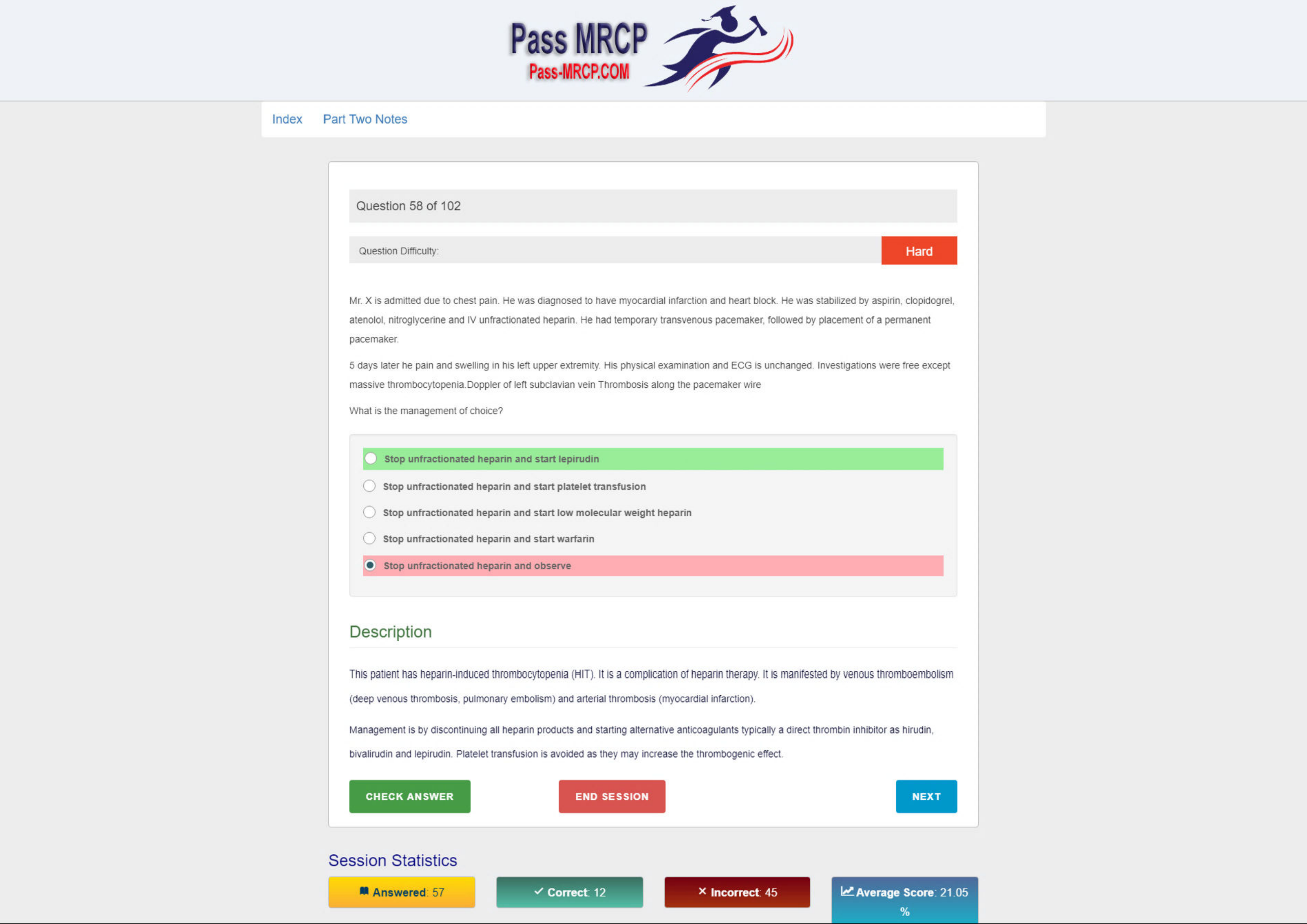
○ **Sickle cell disease**
○ **Anemia of chronic disease**
○ **Iron deficiency anemia**
○ **Cold autoimmune hemolytic anemia**
● **Warm autoimmune hemolytic anemia**

Description

Autoimmune hemolytic anemia (AIHA) occurs when antibodies directed against the person's own RBCs causing extravascular hemolysis. It is manifested by:

- Positive direct Coomb test
- Anemia with reticulocytosis
- Increased lactate dehydrogenase (LDH) level
- Increased indirect bilirubin and urobilinogen levels
- Normal serum haptoglobin
- Hemoglobinuria

RBC agglutination at room temperature excludes cold autoimmune hemolytic anemia.



Question 58 of 102

Question Difficulty: **Hard**

Mr. X is admitted due to chest pain. He was diagnosed to have myocardial infarction and heart block. He was stabilized by aspirin, clopidogrel, atenolol, nitroglycerine and IV unfractionated heparin. He had temporary transvenous pacemaker, followed by placement of a permanent pacemaker.

5 days later he pain and swelling in his left upper extremity. His physical examination and ECG is unchanged. Investigations were free except massive thrombocytopenia.Doppler of left subclavian vein Thrombosis along the pacemaker wire

What is the management of choice?

- ○ **Stop unfractionated heparin and start lepirudin**
- ○ **Stop unfractionated heparin and start platelet transfusion**
- ○ **Stop unfractionated heparin and start low molecular weight heparin**
- ○ **Stop unfractionated heparin and start warfarin**
- ● **Stop unfractionated heparin and observe**

Description

This patient has heparin-induced thrombocytopenia (HIT). It is a complication of heparin therapy. It is manifested by venous thromboembolism (deep venous thrombosis, pulmonary embolism) and arterial thrombosis (myocardial infarction).

Management is by discontinuing all heparin products and starting alternative anticoagulants typically a direct thrombin inhibitor as hirudin, bivalirudin and lepirudin. Platelet transfusion is avoided as they may increase the thrombogenic effect.

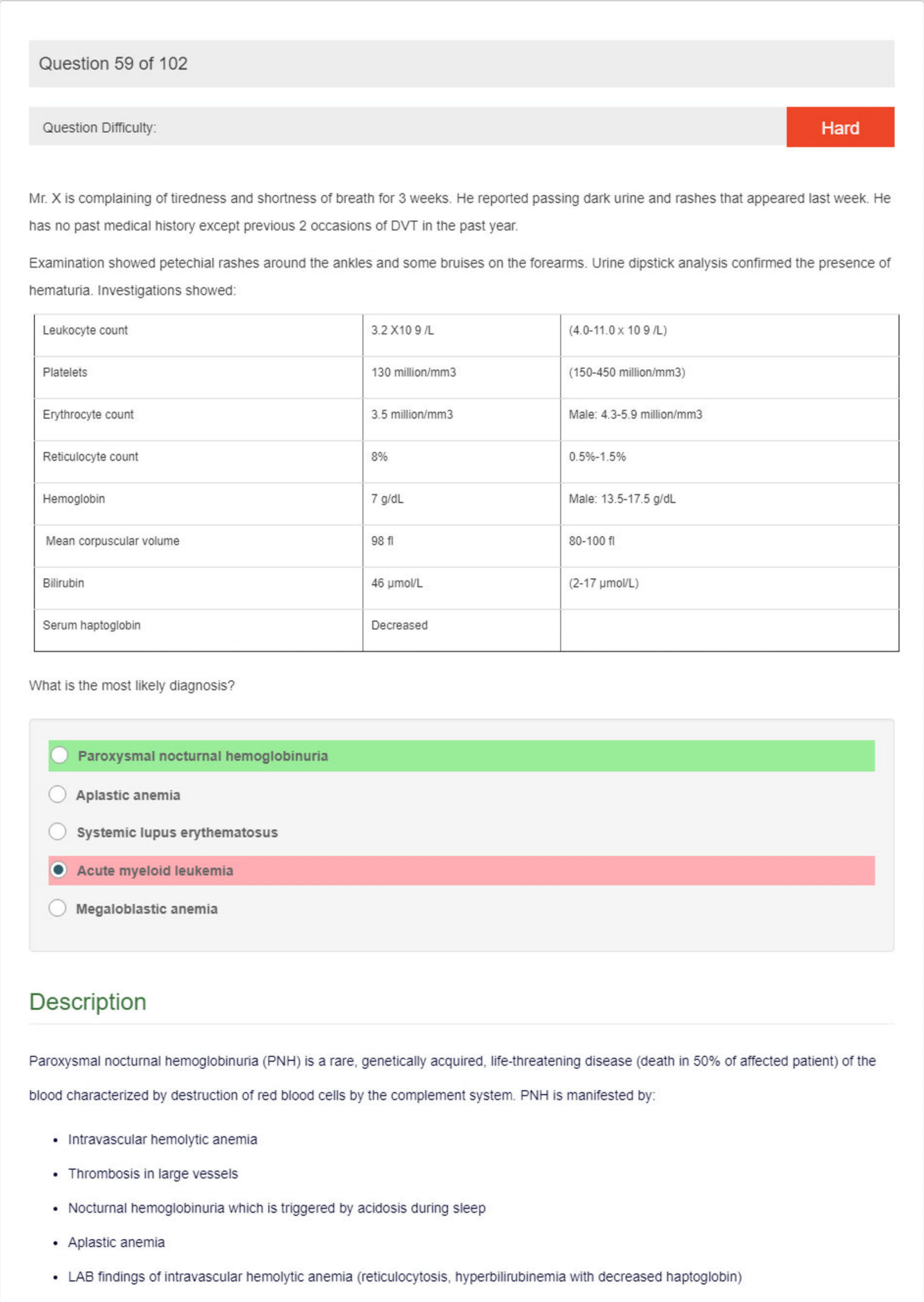
Session Statistics

Answered: 57

✓ **Correct**: 12

× **Incorrect**: 45

Average Score: 21.05 %



Question 59 of 102

Question Difficulty: **Hard**

Mr. X is complaining of tiredness and shortness of breath for 3 weeks. He reported passing dark urine and rashes that appeared last week. He has no past medical history except previous 2 occasions of DVT in the past year.

Examination showed petechial rashes around the ankles and some bruises on the forearms. Urine dipstick analysis confirmed the presence of hematuria. Investigations showed:

Leukocyte count	3.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	130 million/mm3	(150-450 million/mm3)
Erythrocyte count	3.5 million/mm3	Male: 4.3-5.9 million/mm3
Reticulocyte count	8%	0.5%-1.5%
Hemoglobin	7 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	98 fl	80-100 fl
Bilirubin	46 µmol/L	(2-17 µmol/L)
Serum haptoglobin	Decreased	

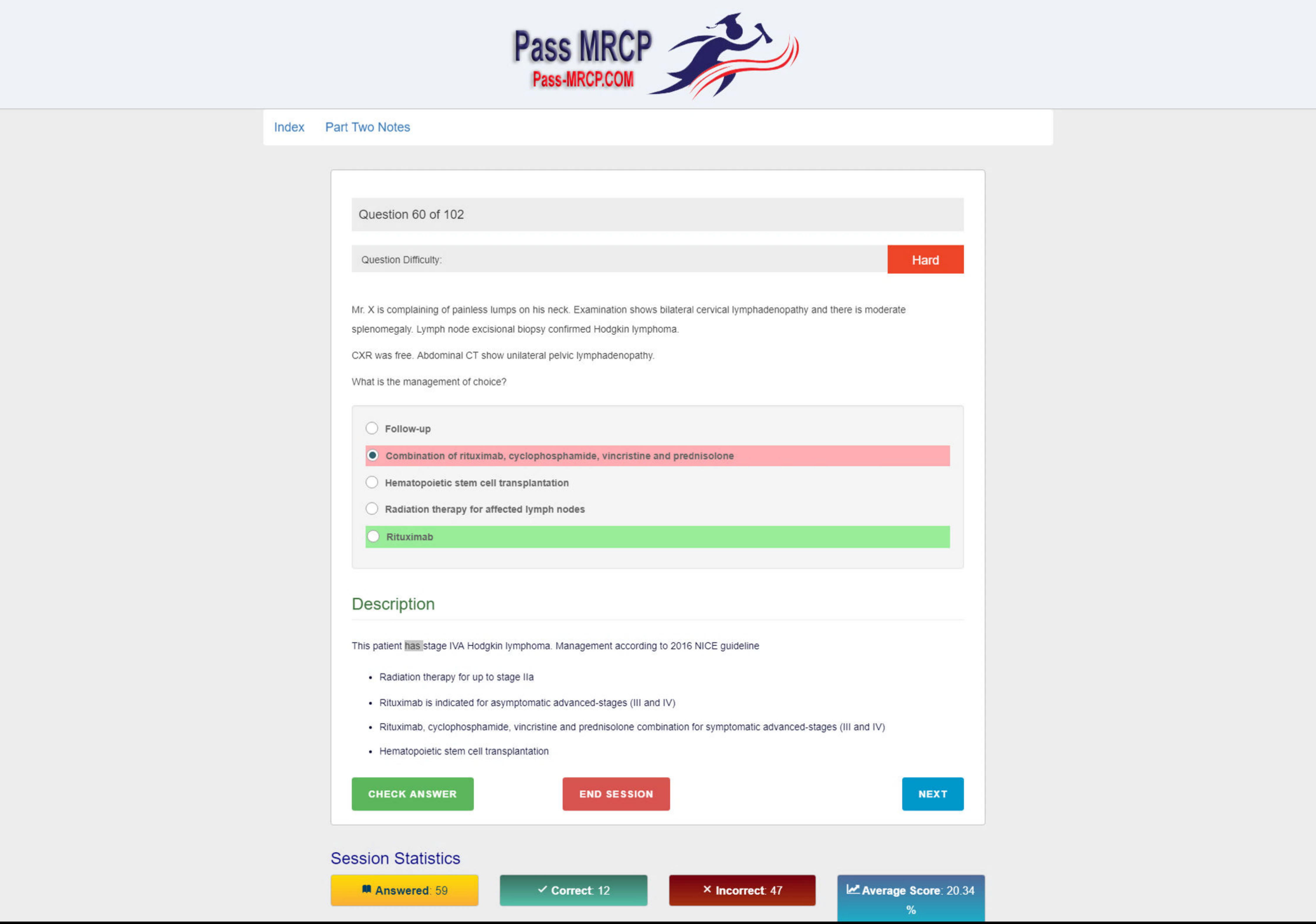
What is the most likely diagnosis?

- ○ **Paroxysmal nocturnal hemoglobinuria**
- ○ **Aplastic anemia**
- ○ **Systemic lupus erythematosus**
- ● **Acute myeloid leukemia**
- ○ **Megaloblastic anemia**

Description

Paroxysmal nocturnal hemoglobinuria (PNH) is a rare, genetically acquired, life-threatening disease (death in 50% of affected patient) of the blood characterized by destruction of red blood cells by the complement system. PNH is manifested by:

- Intravascular hemolytic anemia
- Thrombosis in large vessels
- Nocturnal hemoglobinuria which is triggered by acidosis during sleep
- Aplastic anemia
- LAB findings of intravascular hemolytic anemia (reticulocytosis, hyperbilirubinemia with decreased haptoglobin)



Question 60 of 102

Question Difficulty: Hard

Mr. X is complaining of painless lumps on his neck. Examination shows bilateral cervical lymphadenopathy and there is moderate splenomegaly. Lymph node excisional biopsy confirmed Hodgkin lymphoma.

CXR was free. Abdominal CT show unilateral pelvic lymphadenopathy.

What is the management of choice?

○ **Follow-up**
● **Combination of rituximab, cyclophosphamide, vincristine and prednisolone**
○ **Hematopoietic stem cell transplantation**
○ **Radiation therapy for affected lymph nodes**
○ **Rituximab**

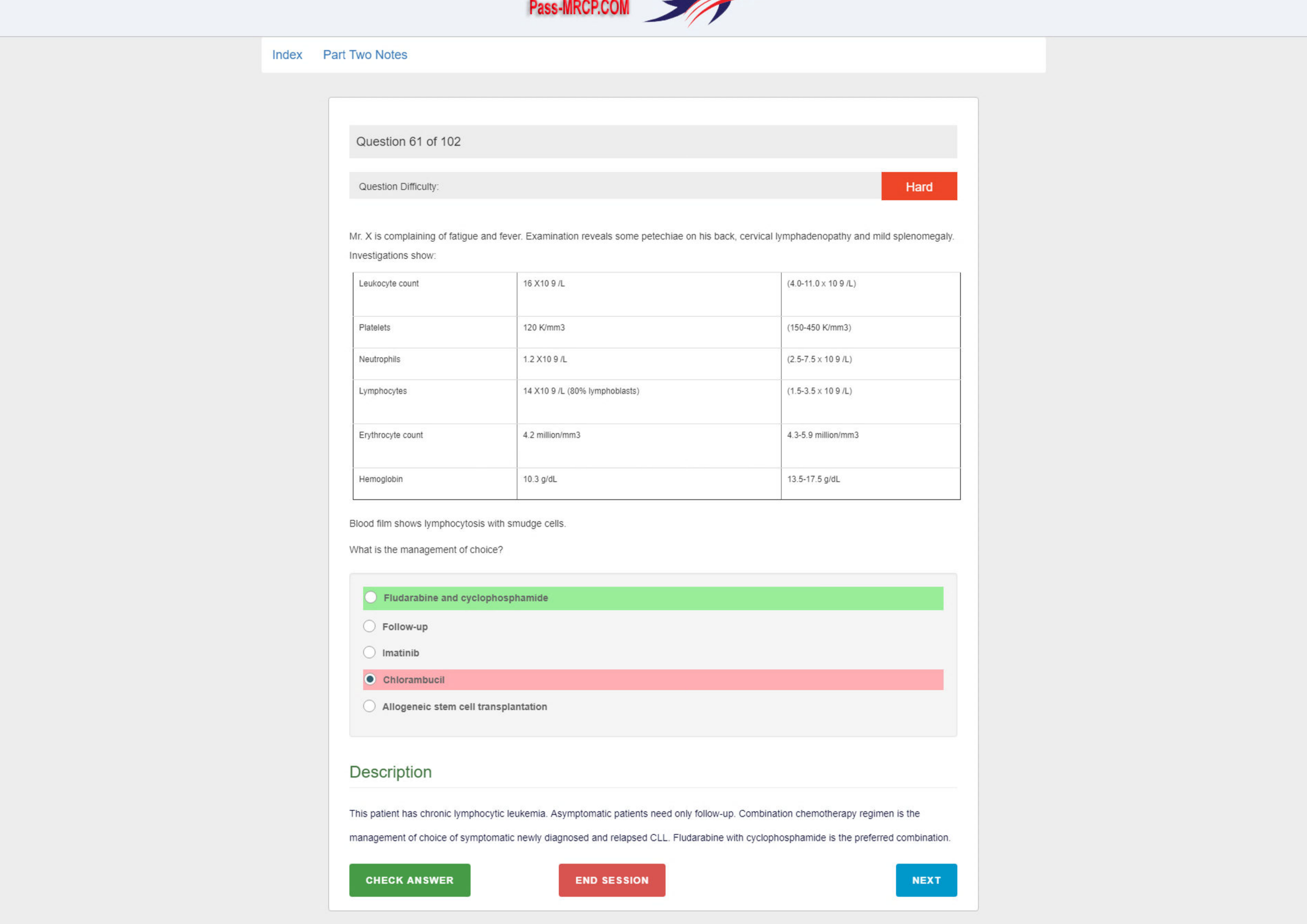
Description

This patient has stage IVA Hodgkin lymphoma. Management according to 2016 NICE guideline

- Radiation therapy for up to stage IIa
- Rituximab is indicated for asymptomatic advanced-stages (III and IV)
- Rituximab, cyclophosphamide, vincristine and prednisolone combination for symptomatic advanced-stages (III and IV)
- Hematopoietic stem cell transplantation

Session Statistics

Answered: 59
Correct: 12
Incorrect: 47
Average Score: 20.34 %



Question 61 of 102

Question Difficulty: **Hard**

Mr. X is complaining of fatigue and fever. Examination reveals some petechiae on his back, cervical lymphadenopathy and mild splenomegaly. Investigations show:

Leukocyte count	16 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	120 K/mm3	(150-450 K/mm3)
Neutrophils	1.2 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	14 X10 9 /L (80% lymphoblasts)	(1.5-3.5 x 10 9 /L)
Erythrocyte count	4.2 million/mm3	4.3-5.9 million/mm3
Hemoglobin	10.3 g/dL	13.5-17.5 g/dL

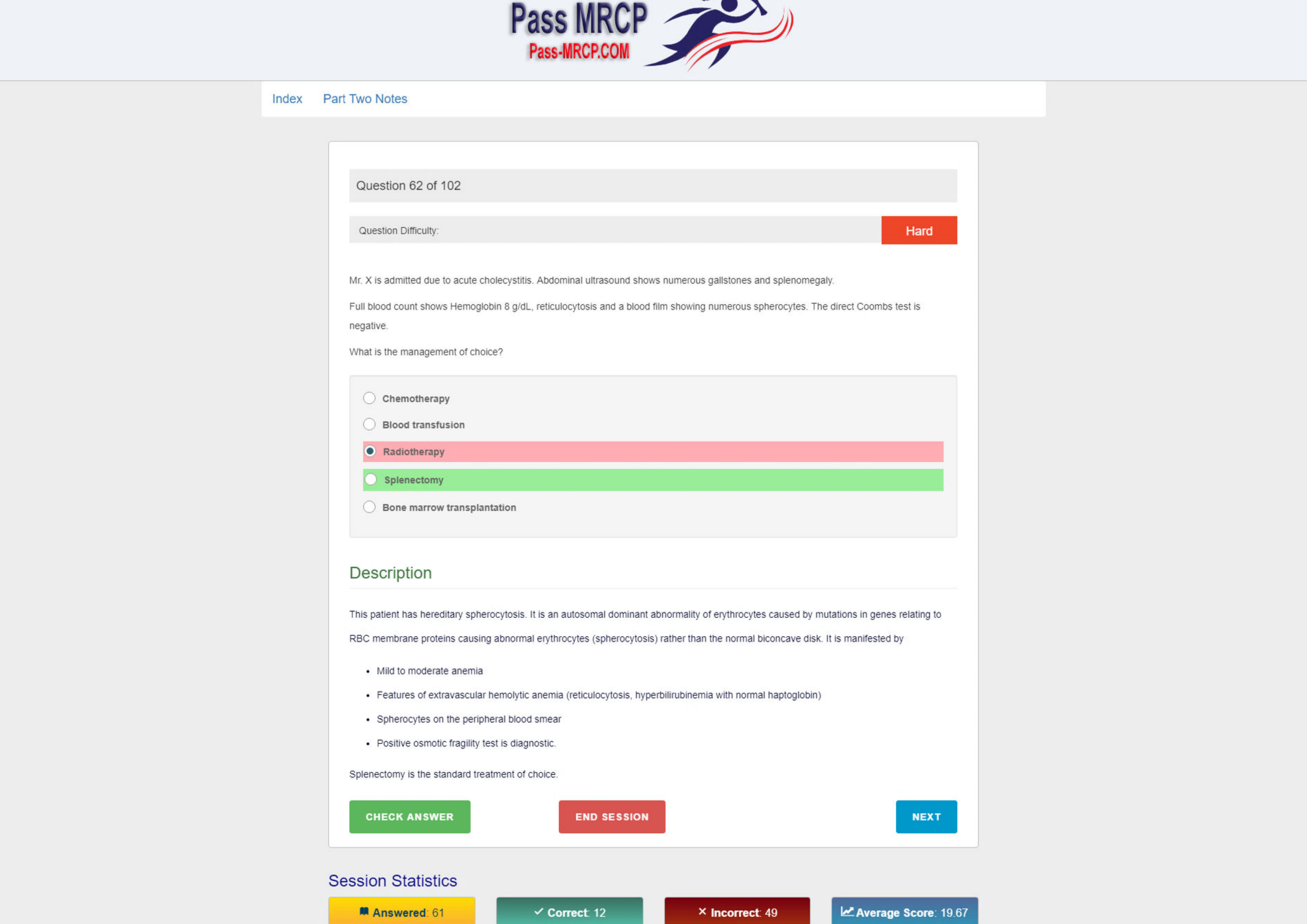
Blood film shows lymphocytosis with smudge cells.

What is the management of choice?

- ○ **Fludarabine and cyclophosphamide**
- ○ **Follow-up**
- ○ **Imatinib**
- ● **Chlorambucil**
- ○ **Allogeneic stem cell transplantation**

Description

This patient has chronic lymphocytic leukemia. Asymptomatic patients need only follow-up. Combination chemotherapy regimen is the management of choice of symptomatic newly diagnosed and relapsed CLL. Fludarabine with cyclophosphamide is the preferred combination.



Question 62 of 102

Question Difficulty: **Hard**

Mr. X is admitted due to acute cholecystitis. Abdominal ultrasound shows numerous gallstones and splenomegaly.

Full blood count shows Hemoglobin 8 g/dL, reticulocytosis and a blood film showing numerous spherocytes. The direct Coombs test is negative.

What is the management of choice?

○ **Chemotherapy**
○ **Blood transfusion**
● **Radiotherapy**
○ **Splenectomy**
○ **Bone marrow transplantation**

Description

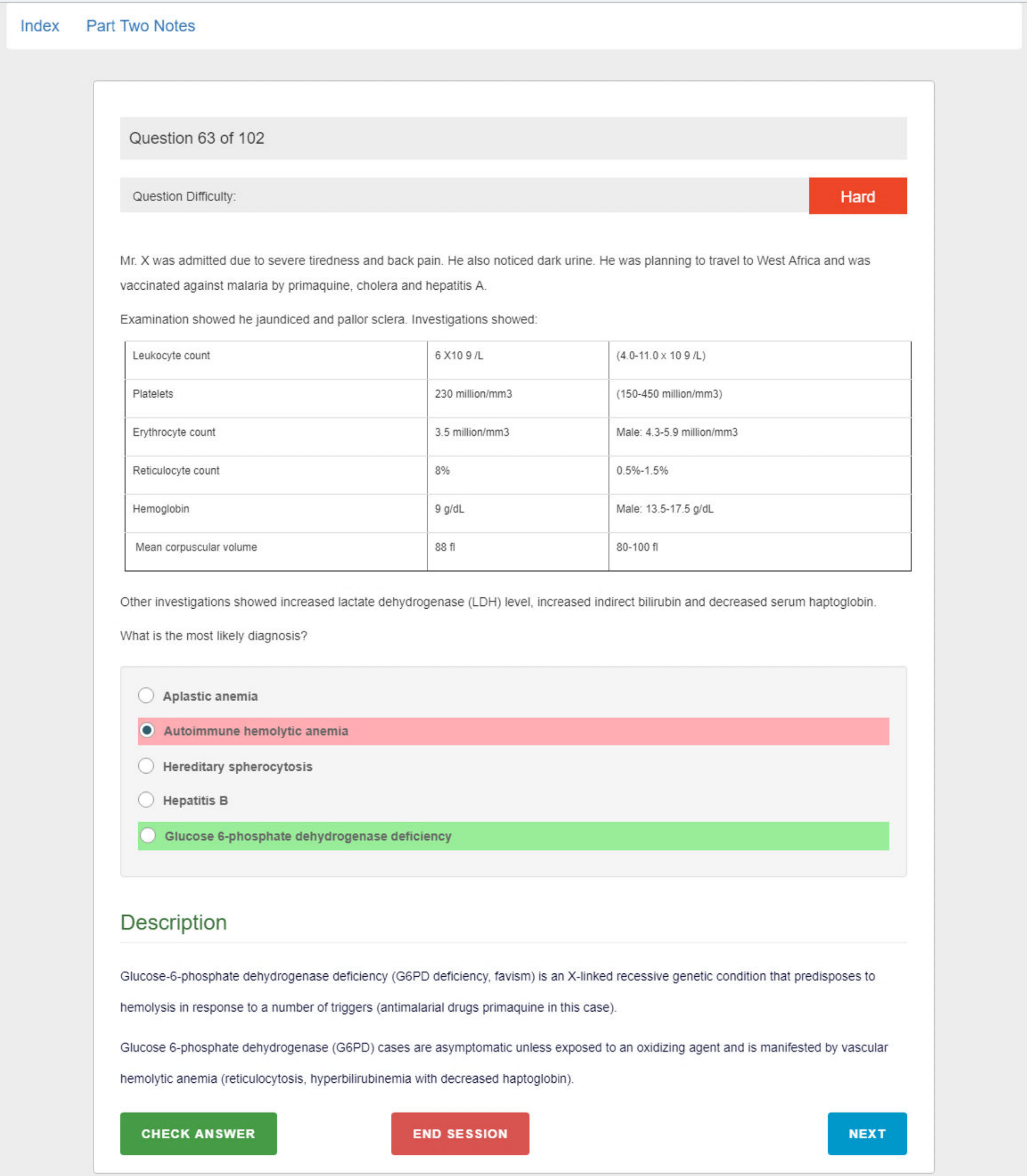
This patient has hereditary spherocytosis. It is an autosomal dominant abnormality of erythrocytes caused by mutations in genes relating to RBC membrane proteins causing abnormal erythrocytes (spherocytosis) rather than the normal biconcave disk. It is manifested by

- Mild to moderate anemia
- Features of extravascular hemolytic anemia (reticulocytosis, hyperbilirubinemia with normal haptoglobin)
- Spherocytes on the peripheral blood smear
- Positive osmotic fragility test is diagnostic.

Splenectomy is the standard treatment of choice.

Session Statistics

Answered: 61
✓ **Correct**: 12
✕ **Incorrect**: 49
Average Score: 19.67



Question 63 of 102

Question Difficulty: **Hard**

Mr. X was admitted due to severe tiredness and back pain. He also noticed dark urine. He was planning to travel to West Africa and was vaccinated against malaria by primaquine, cholera and hepatitis A.

Examination showed he jaundiced and pallor sclera. Investigations showed:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	230 million/mm3	(150-450 million/mm3)
Erythrocyte count	3.5 million/mm3	Male: 4.3-5.9 million/mm3
Reticulocyte count	8%	0.5%-1.5%
Hemoglobin	9 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	88 fl	80-100 fl

Other investigations showed increased lactate dehydrogenase (LDH) level, increased indirect bilirubin and decreased serum haptoglobin.

What is the most likely diagnosis?

- ○ **Aplastic anemia**
- ● **Autoimmune hemolytic anemia**
- ○ **Hereditary spherocytosis**
- ○ **Hepatitis B**
- ○ **Glucose 6-phosphate dehydrogenase deficiency**

Description

Glucose-6-phosphate dehydrogenase deficiency (G6PD deficiency, favism) is an X-linked recessive genetic condition that predisposes to hemolysis in response to a number of triggers (antimalarial drugs primaquine in this case).

Glucose 6-phosphate dehydrogenase (G6PD) cases are asymptomatic unless exposed to an oxidizing agent and is manifested by vascular hemolytic anemia (reticulocytosis, hyperbilirubinemia with decreased haptoglobin).

Question 64 of 102

Question Difficulty: **Hard**

Mr. X is complaining of weight loss and headaches. He also reported visual disturbance but neurological examination was free. Examination revealed axillary lymphadenopathy and splenomegaly. Investigations show:

Serum creatinine	98 mmol/L	(53-106 mmol/L)
Serum calcium	2.5 mmol/L	(2.1-2.8 mmol/L)
Leukocyte count	6.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	160 K/mm3	(150-450 K/mm3)
Erythrocyte count	4.2 million/mm3	4.3-5.9 million/mm3
Serum albumin	40 g/L	(35 - 50 g/L)
Serum globulin	25 g/L	(26 - 46 g/L)

Serum protein electrophoresis was requested and showed:

IgG	12 g/L	(6.5-15 g/L)
IgM	16 g/L	(0.4-3.45 g/L)
IgA	1.5 g/L	(0.76-3.90 g/L)
IgA	1.5 g/L	(0.76-3.90 g/L)

What is the most likely diagnosis?

○ **Antiphospholipid syndrome**

○ **Multiple myeloma**

● **Monoclonal gammopathy of undetermined significance**

○ **Waldenstrom macroglobulinemia**

○ **Acute promyelocytic leukemia**

Description

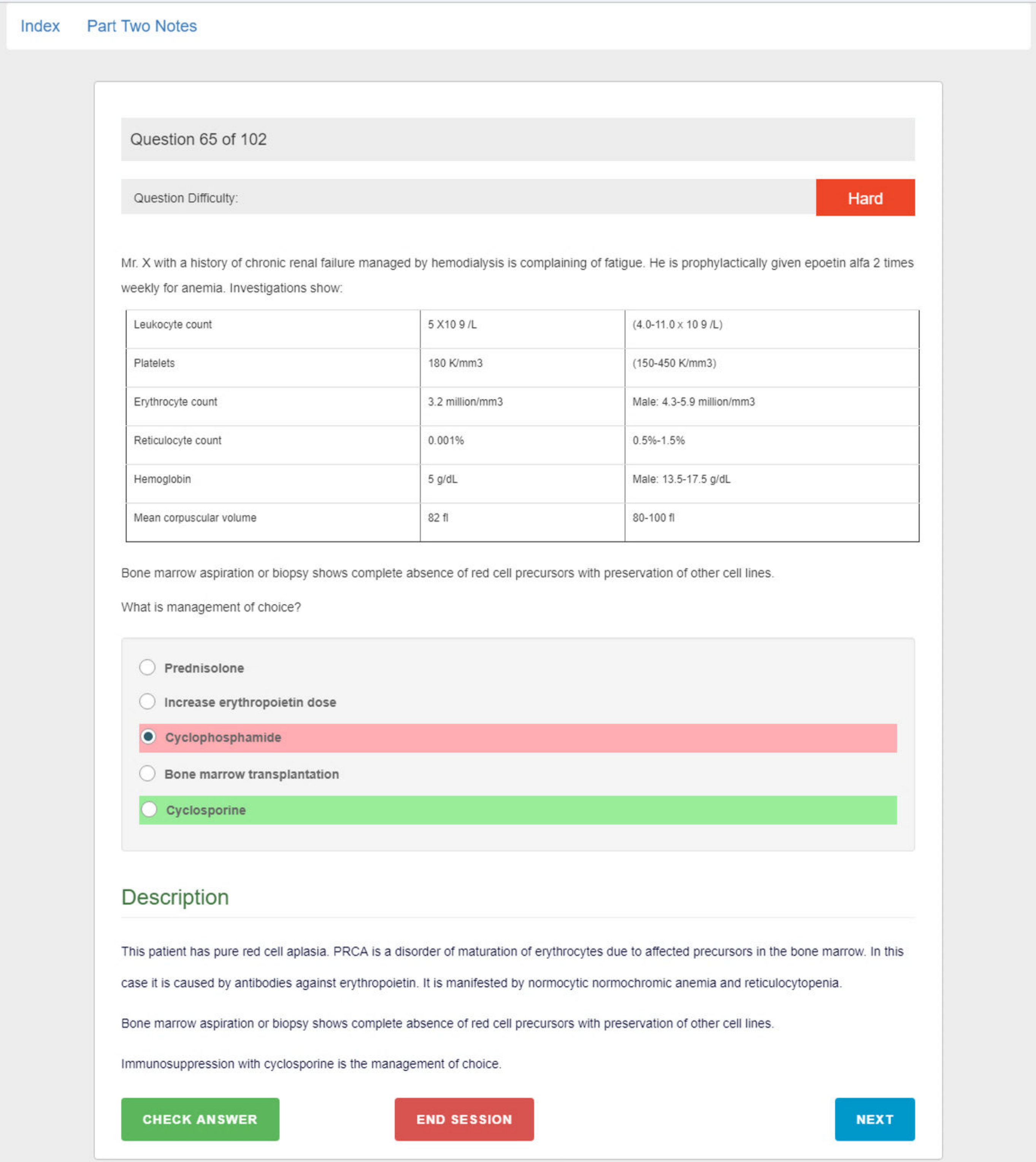
Waldenstrom macroglobulinemia is a chronic, indolent, lymphoproliferative disorder that is characterized by the presence of a high level of a macroglobulin (IgM) and hyperviscosity syndrome. Other manifestations include:

- Diarrhea and malabsorption secondary to gastrointestinal involvement
- Renal failure
- Amyloidosis of the heart, kidney, liver, lungs, and joints
- Bleeding manifestations secondary to platelet dysfunction and coagulation factor and fibrinogen abnormalities
- Raynaud phenomenon secondary to cryoglobulinemia
- Recurrent infection due to B-cell dysfunction
- Lymph node enlargement
- Hepato-splenomegaly

CHECK ANSWER END SESSION NEXT

Session Statistics

Answered: 63 ✓ **Correct**: 12 ✕ **Incorrect**: 51 **Average Score**: 19.05 %



Question 65 of 102

Question Difficulty: **Hard**

Mr. X with a history of chronic renal failure managed by hemodialysis is complaining of fatigue. He is prophylactically given epoetin alfa 2 times weekly for anemia. Investigations show:

Leukocyte count	5 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	180 K/mm3	(150-450 K/mm3)
Erythrocyte count	3.2 million/mm3	Male: 4.3-5.9 million/mm3
Reticulocyte count	0.001%	0.5%-1.5%
Hemoglobin	5 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	82 fl	80-100 fl

Bone marrow aspiration or biopsy shows complete absence of red cell precursors with preservation of other cell lines.

What is management of choice?

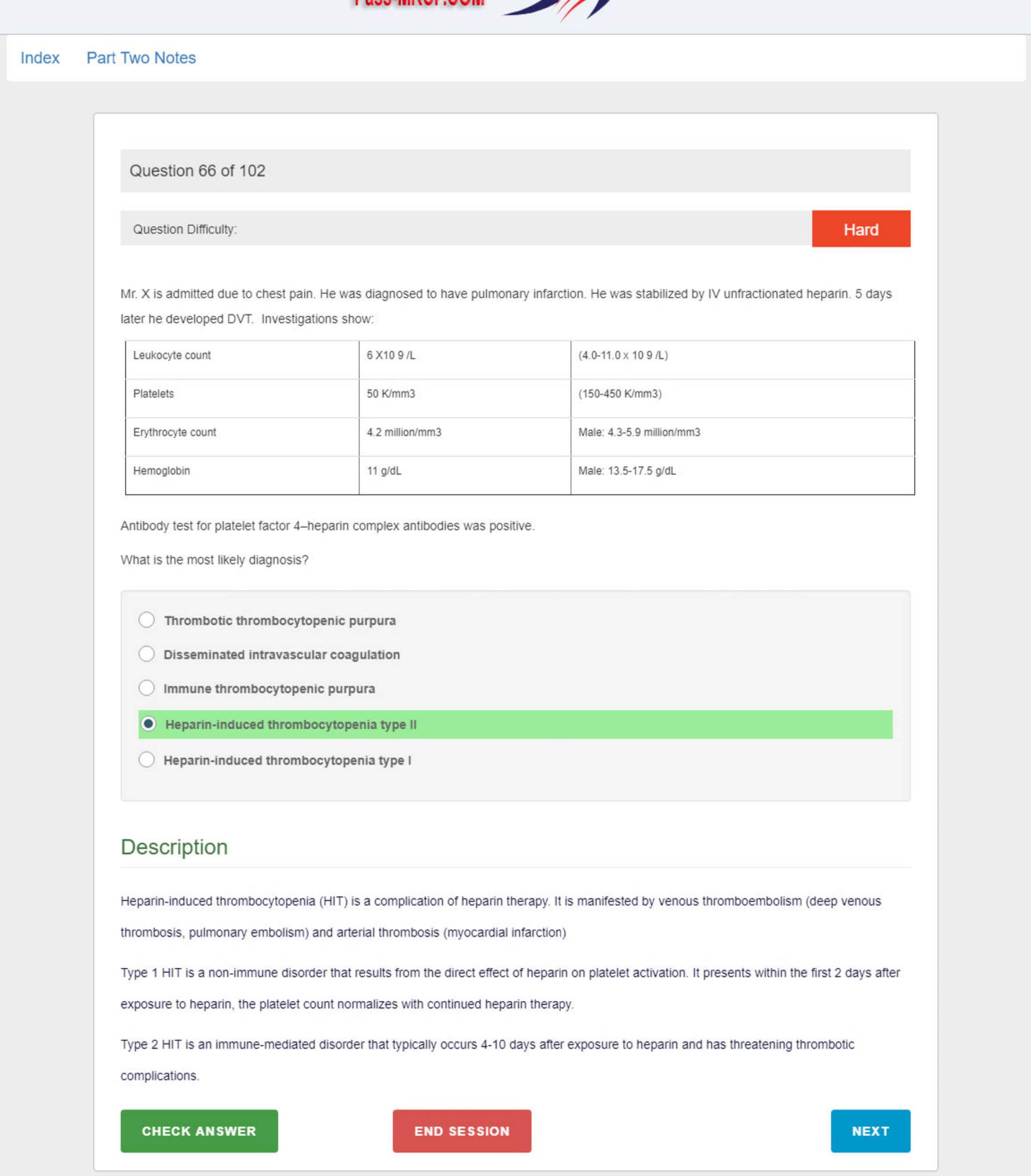
- ○ **Prednisolone**
- ○ **Increase erythropoietin dose**
- ● **Cyclophosphamide** 🟥
- ○ **Bone marrow transplantation**
- ○ **Cyclosporine** 🟩

Description

This patient has pure red cell aplasia. PRCA is a disorder of maturation of erythrocytes due to affected precursors in the bone marrow. In this case it is caused by antibodies against erythropoietin. It is manifested by normocytic normochromic anemia and reticulocytopenia.

Bone marrow aspiration or biopsy shows complete absence of red cell precursors with preservation of other cell lines.

Immunosuppression with cyclosporine is the management of choice.



Question 66 of 102

Question Difficulty: **Hard**

Mr. X is admitted due to chest pain. He was diagnosed to have pulmonary infarction. He was stabilized by IV unfractionated heparin. 5 days later he developed DVT. Investigations show:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	50 K/mm3	(150-450 K/mm3)
Erythrocyte count	4.2 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	11 g/dL	Male: 13.5-17.5 g/dL

Antibody test for platelet factor 4–heparin complex antibodies was positive.

What is the most likely diagnosis?

- ○ **Thrombotic thrombocytopenic purpura**
- ○ **Disseminated intravascular coagulation**
- ○ **Immune thrombocytopenic purpura**
- ● **Heparin-induced thrombocytopenia type II**
- ○ **Heparin-induced thrombocytopenia type I**

Description

Heparin-induced thrombocytopenia (HIT) is a complication of heparin therapy. It is manifested by venous thromboembolism (deep venous thrombosis, pulmonary embolism) and arterial thrombosis (myocardial infarction)

Type 1 HIT is a non-immune disorder that results from the direct effect of heparin on platelet activation. It presents within the first 2 days after exposure to heparin, the platelet count normalizes with continued heparin therapy.

Type 2 HIT is an immune-mediated disorder that typically occurs 4-10 days after exposure to heparin and has threatening thrombotic complications.

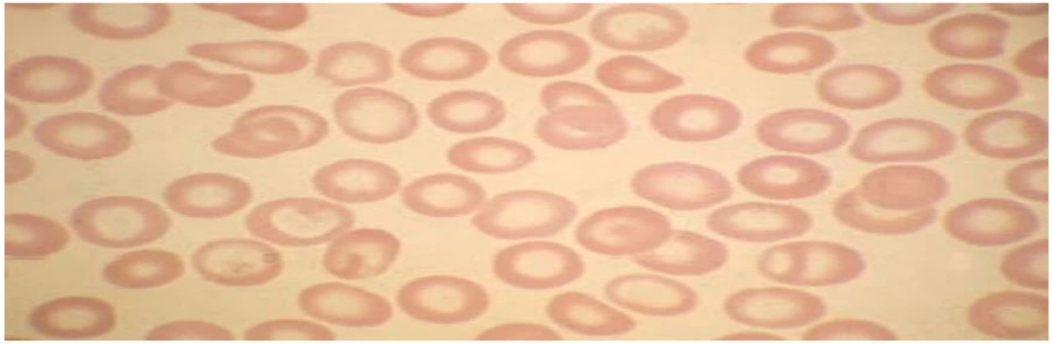
Question 67 of 102

Question Difficulty: **Hard**

Mr. X was referred for investigation of anemia by his GP. He is asymptomatic and has no physical complaints. Examination is unremarkable. His investigations show:

Erythrocyte count	3.9 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	11 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	75 fl	80-100 fl
Mean corpuscular hemoglobin	23 pg/cell	25.4-34.6 pg/cell
Serum ferritin	220 µg/L	Male 20-250 µg/L

His blood film is shown in the image.



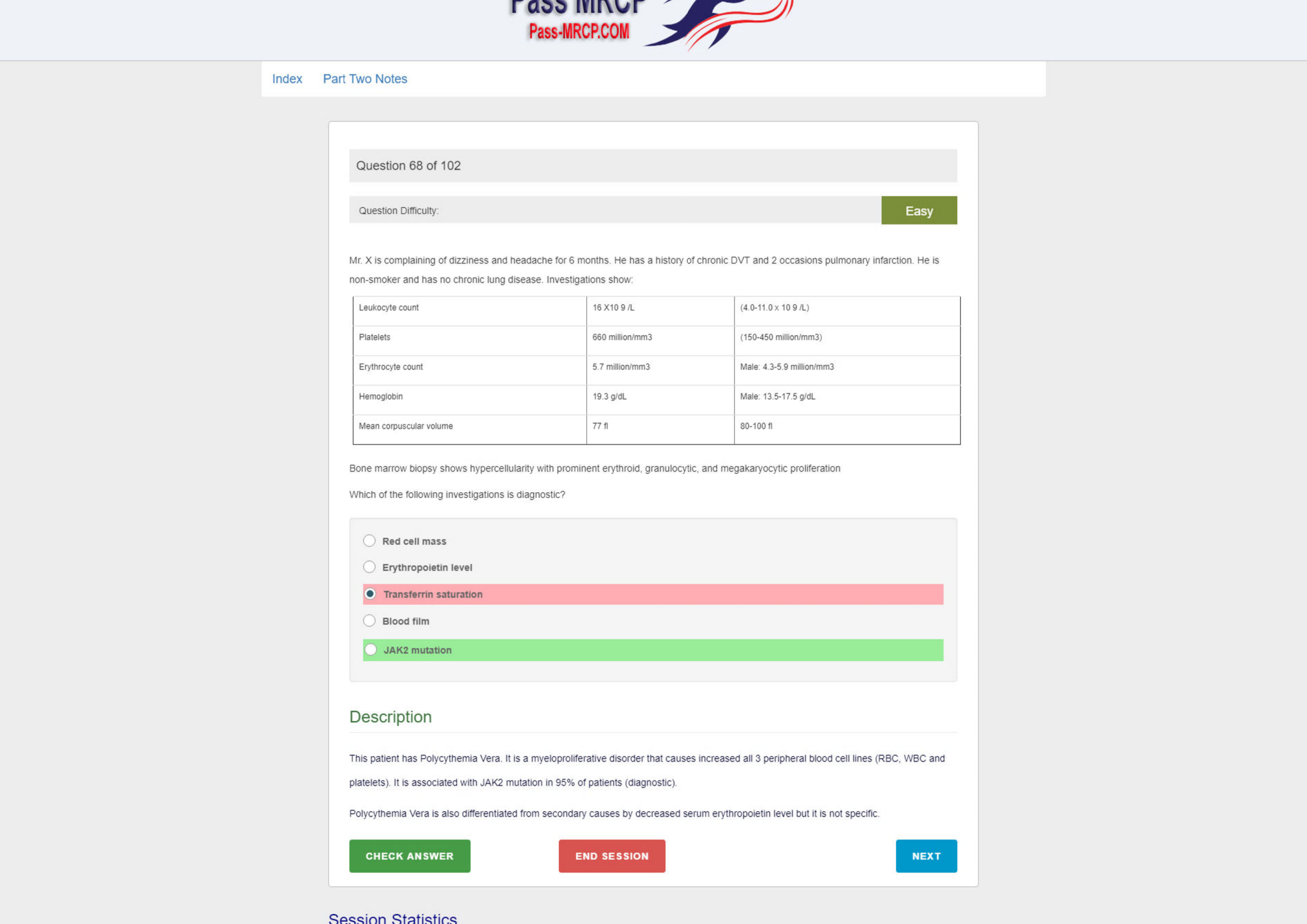
What is the most likely diagnosis?

- ● **Iron-deficiency anemia**
- ○ **Anemia of chronic disease**
- ○ **Beta thalassemia major**
- ○ **Sickle-cell anemia**
- ○ **Beta thalassemia trait**

Description

Beta thalassemia is caused by a genetic deficiency in the synthesis of beta-globin chains. Beta thalassemia trait (thalassemia minor) occurs in the heterozygous state, causing mild to moderate microcytic anemia.

Peripheral blood smear shows mild, isolated microcytic anemia with target cells.



Question 68 of 102

Question Difficulty: **Easy**

Mr. X is complaining of dizziness and headache for 6 months. He has a history of chronic DVT and 2 occasions pulmonary infarction. He is non-smoker and has no chronic lung disease. Investigations show:

Leukocyte count	16 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	660 million/mm3	(150-450 million/mm3)
Erythrocyte count	5.7 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	19.3 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	77 fl	80-100 fl

Bone marrow biopsy shows hypercellularity with prominent erythroid, granulocytic, and megakaryocytic proliferation

Which of the following investigations is diagnostic?

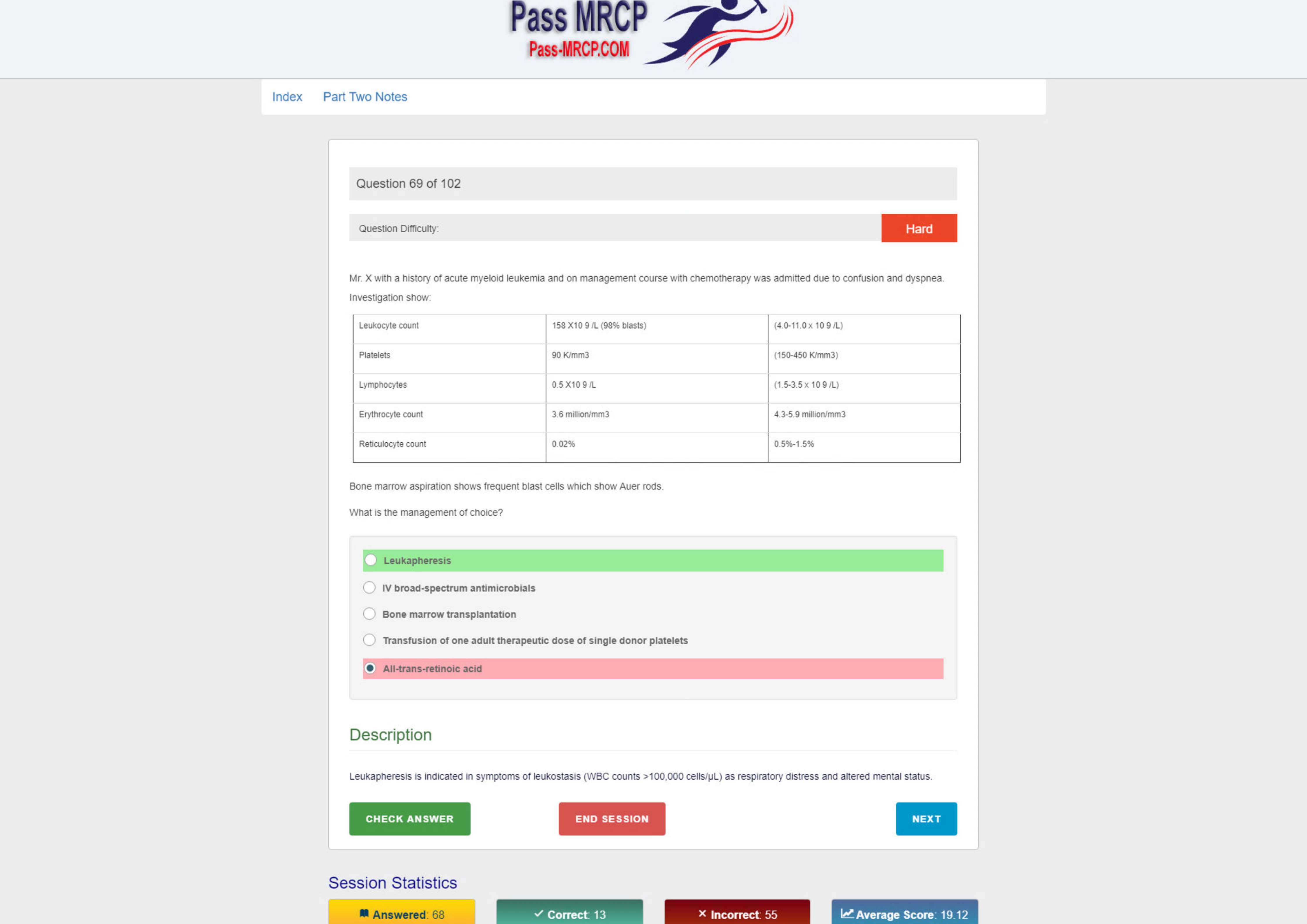
○ **Red cell mass**
○ **Erythropoietin level**
● **Transferrin saturation**
○ **Blood film**
○ **JAK2 mutation**

Description

This patient has Polycythemia Vera. It is a myeloproliferative disorder that causes increased all 3 peripheral blood cell lines (RBC, WBC and platelets). It is associated with JAK2 mutation in 95% of patients (diagnostic).

Polycythemia Vera is also differentiated from secondary causes by decreased serum erythropoietin level but it is not specific.

Session Statistics



Question 69 of 102

Question Difficulty: Hard

Mr. X with a history of acute myeloid leukemia and on management course with chemotherapy was admitted due to confusion and dyspnea.

Investigation show:

Leukocyte count	158 X10 9 /L (98% blasts)	(4.0-11.0 x 10 9 /L)
Platelets	90 K/mm3	(150-450 K/mm3)
Lymphocytes	0.5 X10 9 /L	(1.5-3.5 x 10 9 /L)
Erythrocyte count	3.6 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	0.02%	0.5%-1.5%

Bone marrow aspiration shows frequent blast cells which show Auer rods.

What is the management of choice?

- ○ **Leukapheresis**
- ○ **IV broad-spectrum antimicrobials**
- ○ **Bone marrow transplantation**
- ○ **Transfusion of one adult therapeutic dose of single donor platelets**
- ● **All-trans-retinoic acid**

Description

Leukapheresis is indicated in symptoms of leukostasis (WBC counts >100,000 cells/μL) as respiratory distress and altered mental status.

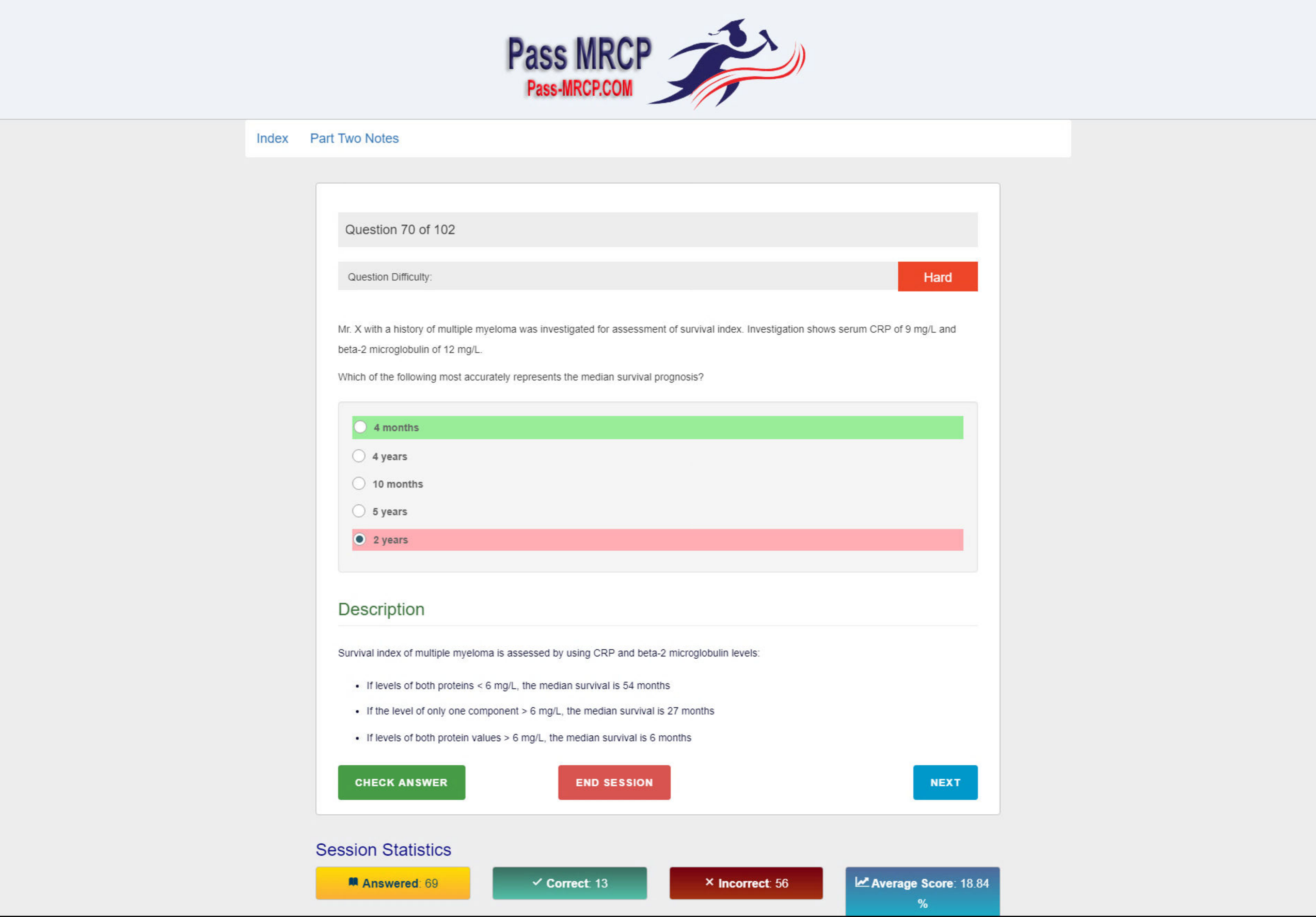
Session Statistics

Answered: 68

✓ **Correct**: 13

✕ **Incorrect**: 55

Average Score: 19.12



Question 70 of 102

Question Difficulty: Hard

Mr. X with a history of multiple myeloma was investigated for assessment of survival index. Investigation shows serum CRP of 9 mg/L and beta-2 microglobulin of 12 mg/L.

Which of the following most accurately represents the median survival prognosis?

○ 4 months
○ 4 years
○ 10 months
○ 5 years
● 2 years

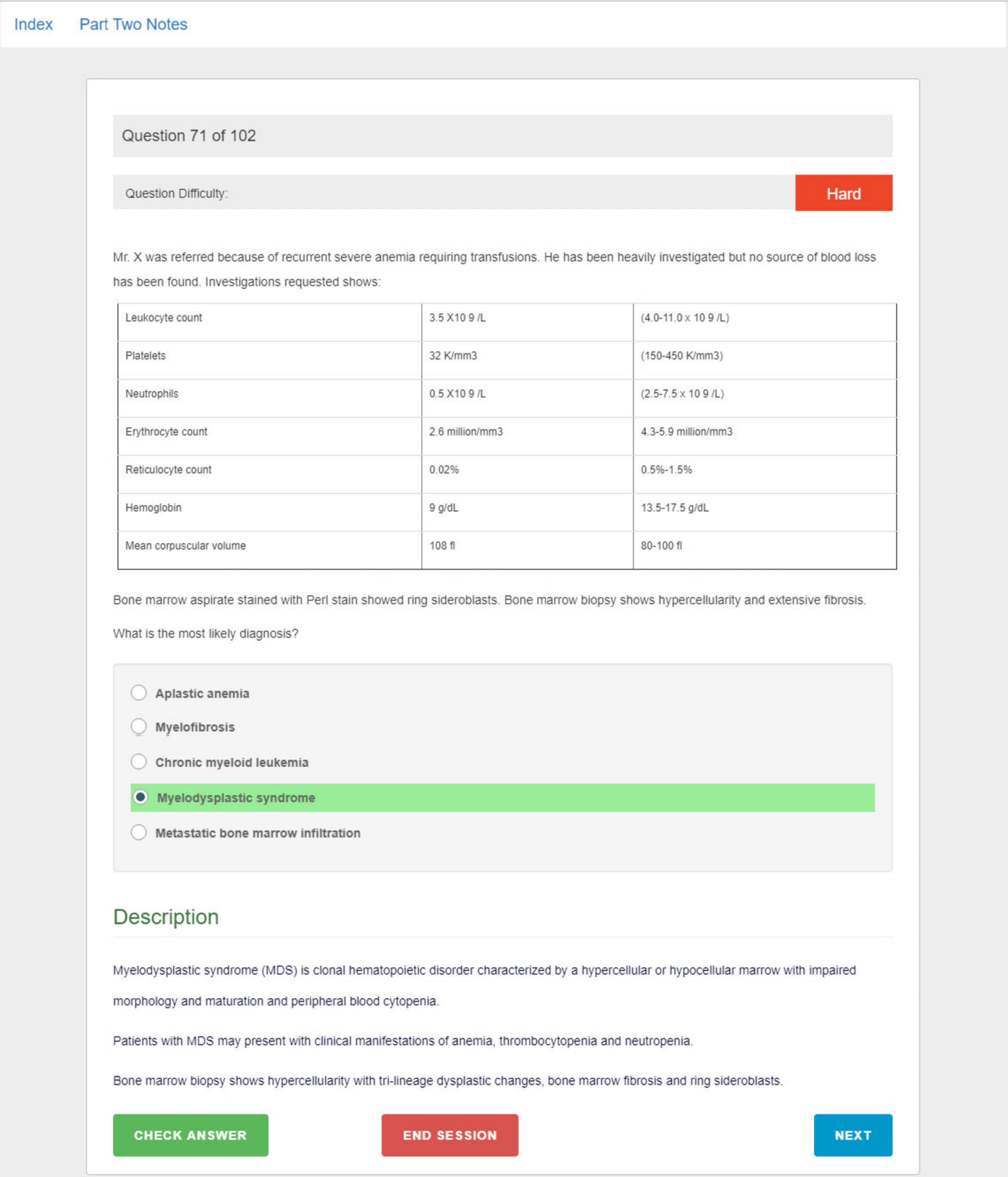
Description

Survival index of multiple myeloma is assessed by using CRP and beta-2 microglobulin levels:

- If levels of both proteins < 6 mg/L, the median survival is 54 months
- If the level of only one component > 6 mg/L, the median survival is 27 months
- If levels of both protein values > 6 mg/L, the median survival is 6 months

Session Statistics

Answered: 69
Correct: 13
Incorrect: 56
Average Score: 18.84 %



Question 71 of 102

Question Difficulty: **Hard**

Mr. X was referred because of recurrent severe anemia requiring transfusions. He has been heavily investigated but no source of blood loss has been found. Investigations requested shows:

Leukocyte count	3.5 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	32 K/mm3	(150-450 K/mm3)
Neutrophils	0.5 X10 9 /L	(2.5-7.5 x 10 9 /L)
Erythrocyte count	2.6 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	0.02%	0.5%-1.5%
Hemoglobin	9 g/dL	13.5-17.5 g/dL
Mean corpuscular volume	108 fl	80-100 fl

Bone marrow aspirate stained with Perl stain showed ring sideroblasts. Bone marrow biopsy shows hypercellularity and extensive fibrosis.

What is the most likely diagnosis?

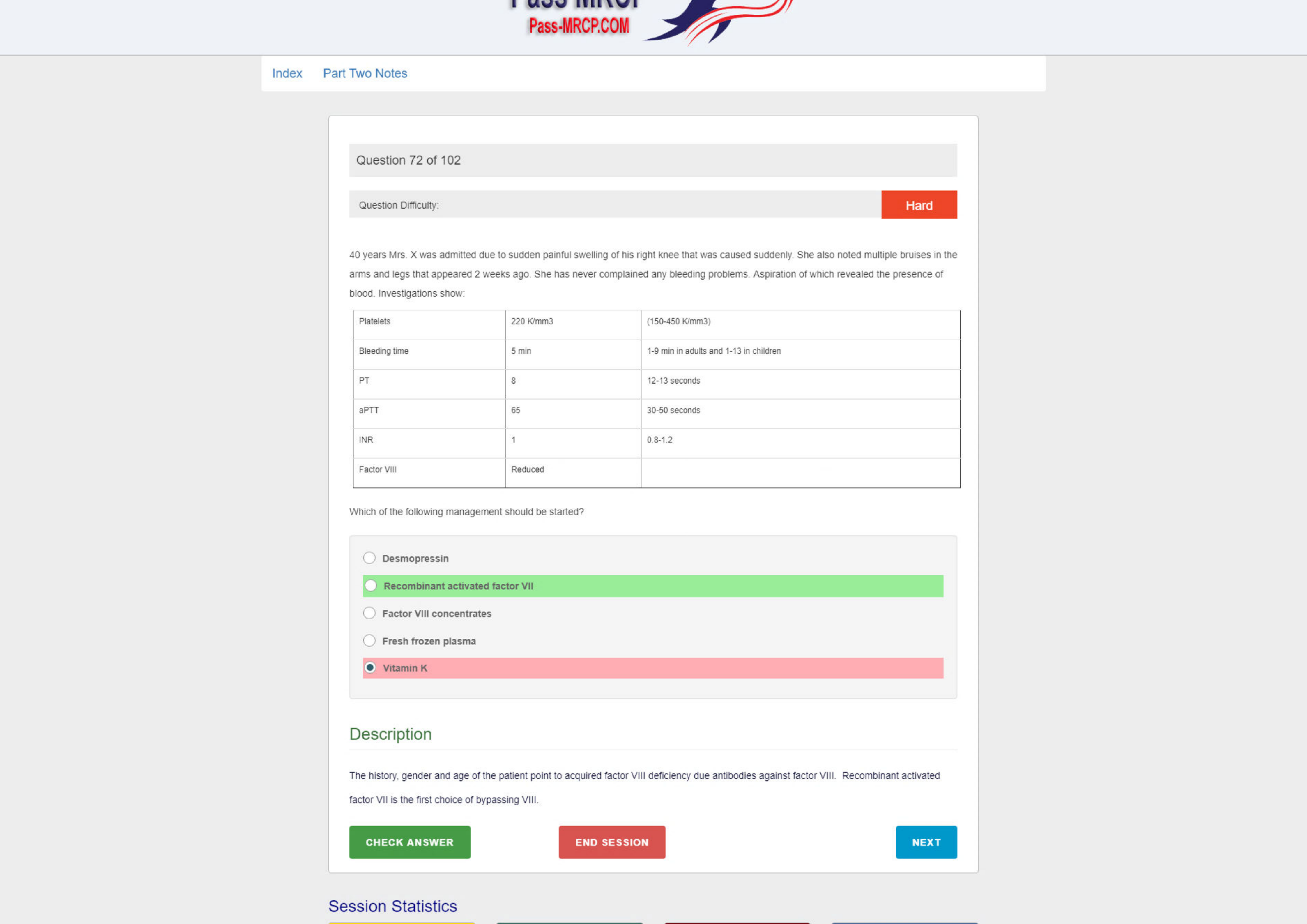
- ○ **Aplastic anemia**
- ○ **Myelofibrosis**
- ○ **Chronic myeloid leukemia**
- ● **Myelodysplastic syndrome**
- ○ **Metastatic bone marrow infiltration**

Description

Myelodysplastic syndrome (MDS) is clonal hematopoietic disorder characterized by a hypercellular or hypocellular marrow with impaired morphology and maturation and peripheral blood cytopenia.

Patients with MDS may present with clinical manifestations of anemia, thrombocytopenia and neutropenia.

Bone marrow biopsy shows hypercellularity with tri-lineage dysplastic changes, bone marrow fibrosis and ring sideroblasts.



Question 72 of 102

Question Difficulty: **Hard**

40 years Mrs. X was admitted due to sudden painful swelling of his right knee that was caused suddenly. She also noted multiple bruises in the arms and legs that appeared 2 weeks ago. She has never complained any bleeding problems. Aspiration of which revealed the presence of blood. Investigations show:

Platelets	220 K/mm3	(150-450 K/mm3)
Bleeding time	5 min	1-9 min in adults and 1-13 in children
PT	8	12-13 seconds
aPTT	65	30-50 seconds
INR	1	0.8-1.2
Factor VIII	Reduced	

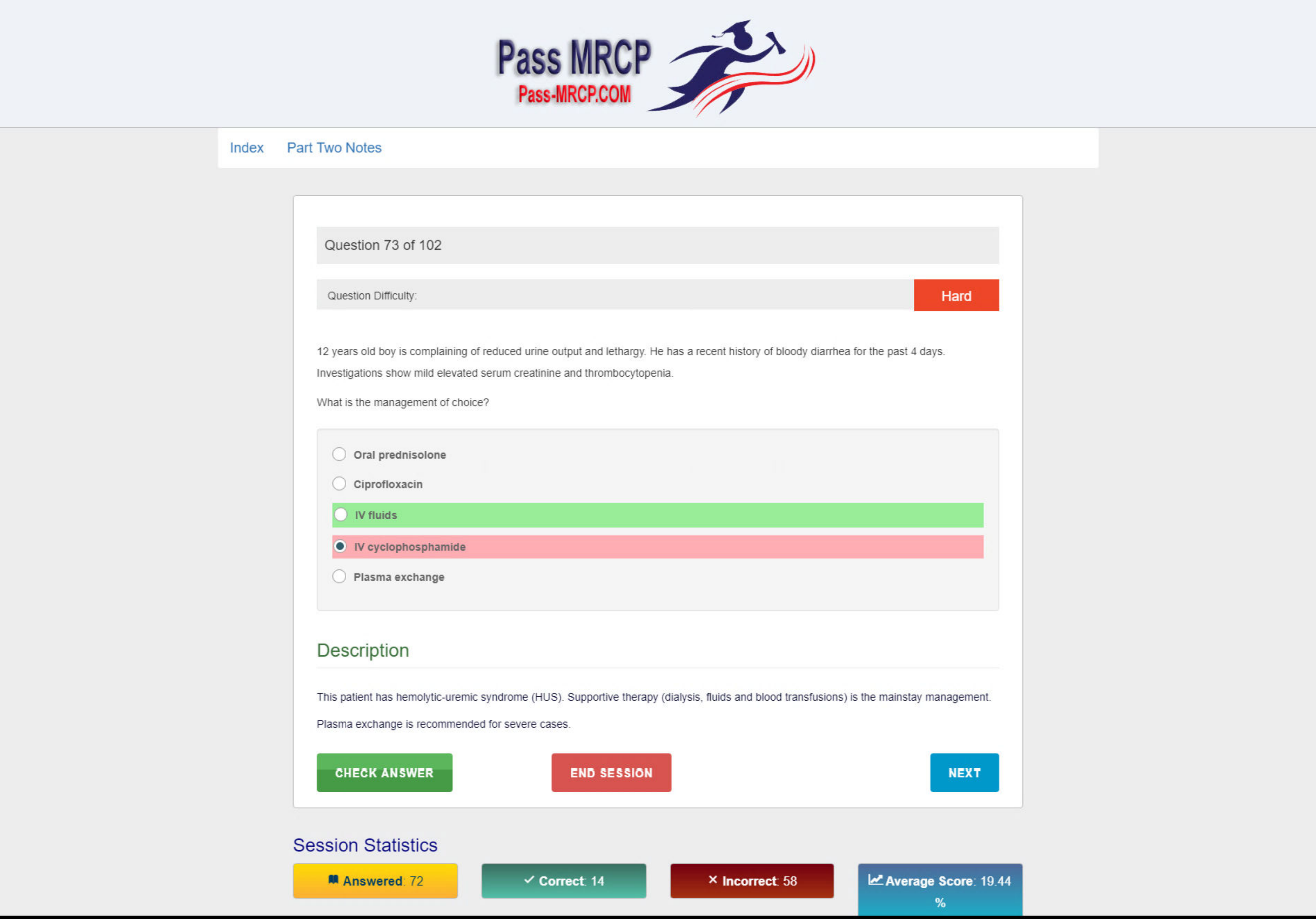
Which of the following management should be started?

- ○ **Desmopressin**
- ○ **Recombinant activated factor VII**
- ○ **Factor VIII concentrates**
- ○ **Fresh frozen plasma**
- ● **Vitamin K**

Description

The history, gender and age of the patient point to acquired factor VIII deficiency due antibodies against factor VIII. Recombinant activated factor VII is the first choice of bypassing VIII.

Session Statistics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Question 73 of 102

Question Difficulty: **Hard**

12 years old boy is complaining of reduced urine output and lethargy. He has a recent history of bloody diarrhea for the past 4 days. Investigations show mild elevated serum creatinine and thrombocytopenia.

What is the management of choice?

- ○ **Oral prednisolone**
- ○ **Ciprofloxacin**
- ○ **IV fluids**
- ● **IV cyclophosphamide**
- ○ **Plasma exchange**

Description

This patient has hemolytic-uremic syndrome (HUS). Supportive therapy (dialysis, fluids and blood transfusions) is the mainstay management.

Plasma exchange is recommended for severe cases.

CHECK ANSWER
END SESSION
NEXT

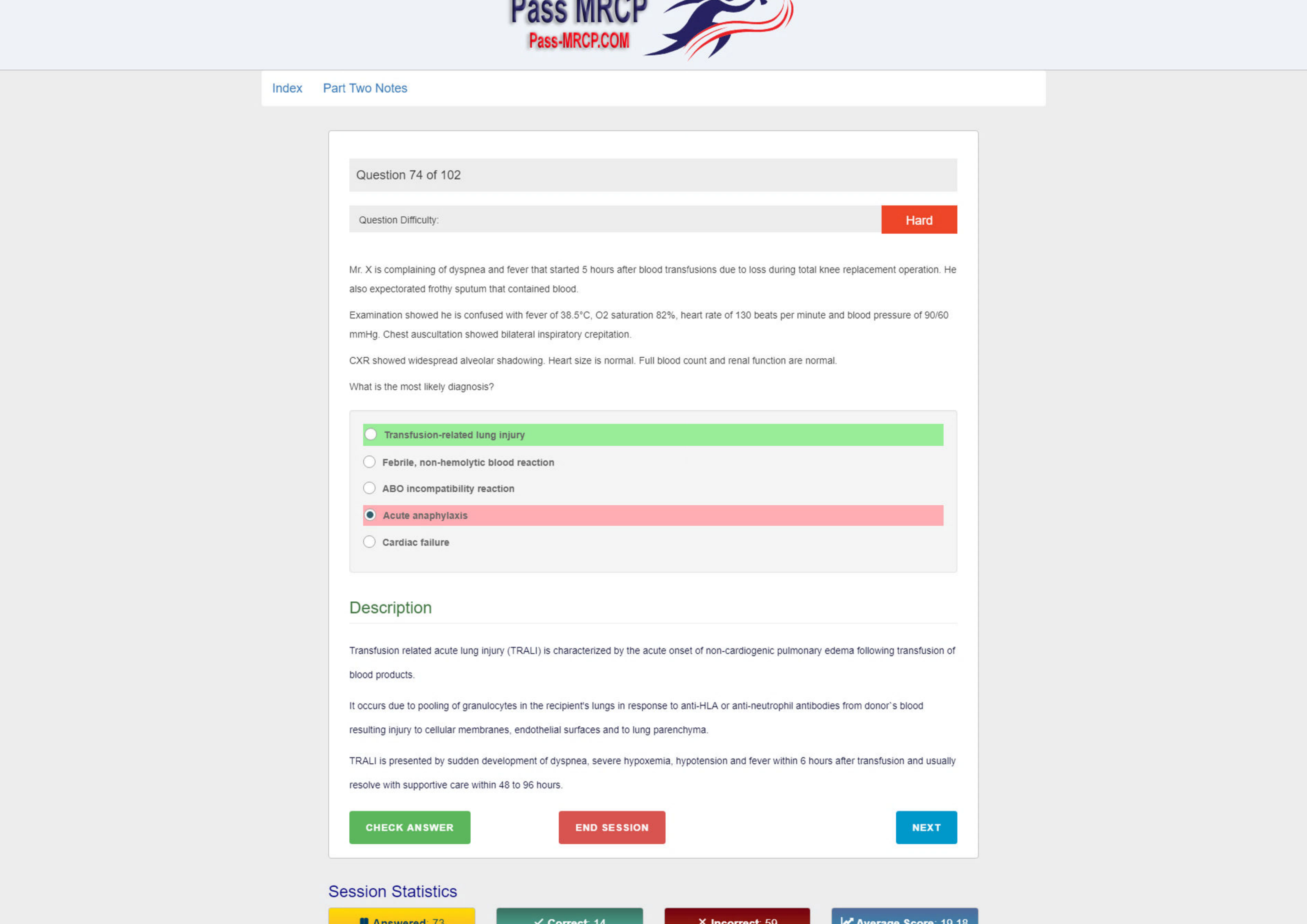
Session Statistics

Answered: 72

✓ **Correct**: 14

× **Incorrect**: 58

Average Score: 19.44 %



Question 74 of 102

Question Difficulty: Hard

Mr. X is complaining of dyspnea and fever that started 5 hours after blood transfusions due to loss during total knee replacement operation. He also expectorated frothy sputum that contained blood.

Examination showed he is confused with fever of 38.5°C, O2 saturation 82%, heart rate of 130 beats per minute and blood pressure of 90/60 mmHg. Chest auscultation showed bilateral inspiratory crepitation.

CXR showed widespread alveolar shadowing. Heart size is normal. Full blood count and renal function are normal.

What is the most likely diagnosis?

- ○ **Transfusion-related lung injury**
- ○ **Febrile, non-hemolytic blood reaction**
- ○ **ABO incompatibility reaction**
- ● **Acute anaphylaxis**
- ○ **Cardiac failure**

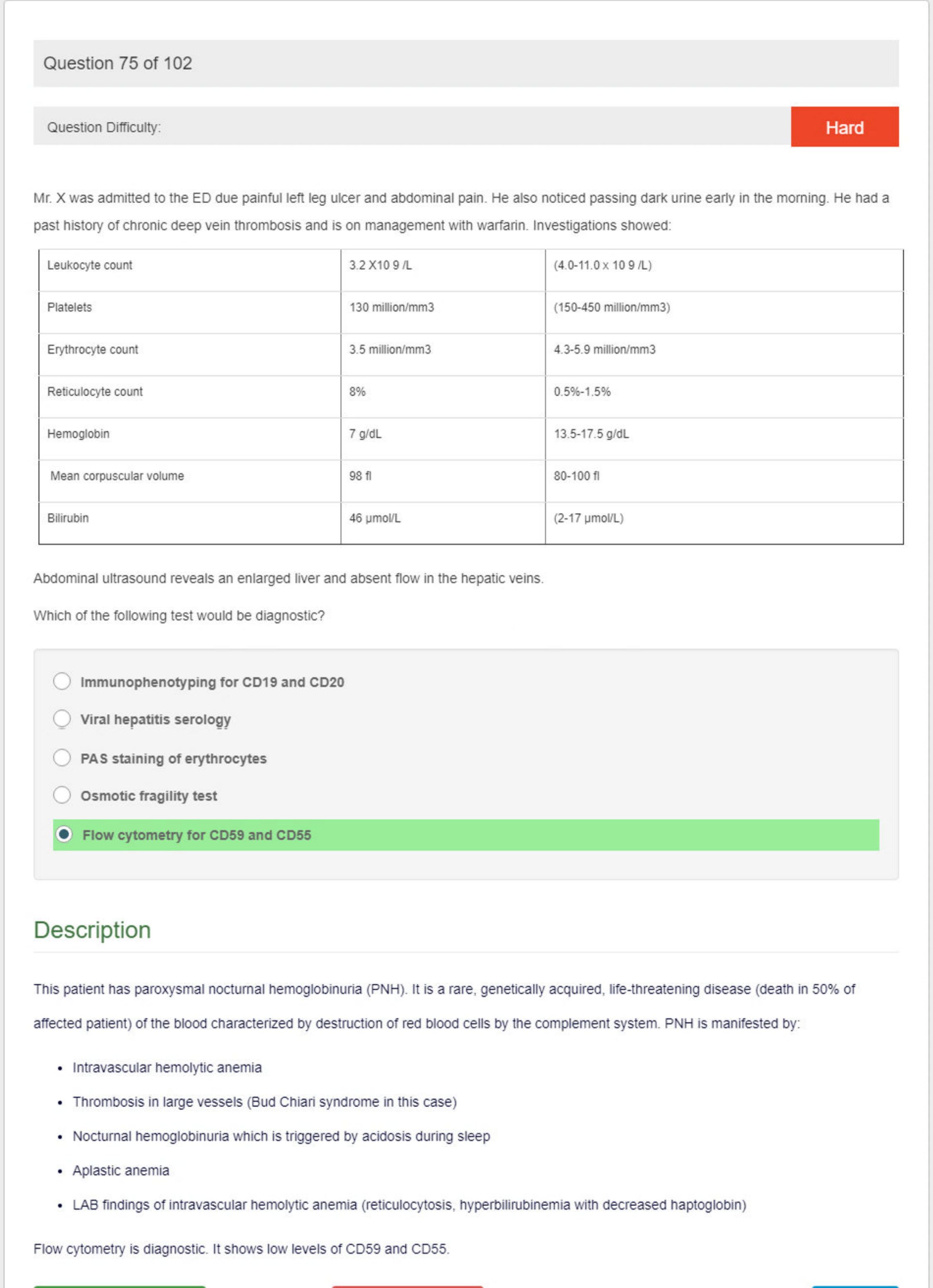
Description

Transfusion related acute lung injury (TRALI) is characterized by the acute onset of non-cardiogenic pulmonary edema following transfusion of blood products.

It occurs due to pooling of granulocytes in the recipient's lungs in response to anti-HLA or anti-neutrophil antibodies from donor`s blood resulting injury to cellular membranes, endothelial surfaces and to lung parenchyma.

TRALI is presented by sudden development of dyspnea, severe hypoxemia, hypotension and fever within 6 hours after transfusion and usually resolve with supportive care within 48 to 96 hours.

Session Statistics



Question 75 of 102

Question Difficulty: **Hard**

Mr. X was admitted to the ED due painful left leg ulcer and abdominal pain. He also noticed passing dark urine early in the morning. He had a past history of chronic deep vein thrombosis and is on management with warfarin. Investigations showed:

Leukocyte count	3.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	130 million/mm3	(150-450 million/mm3)
Erythrocyte count	3.5 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	8%	0.5%-1.5%
Hemoglobin	7 g/dL	13.5-17.5 g/dL
Mean corpuscular volume	98 fl	80-100 fl
Bilirubin	46 µmol/L	(2-17 µmol/L)

Abdominal ultrasound reveals an enlarged liver and absent flow in the hepatic veins.

Which of the following test would be diagnostic?

○ **Immunophenotyping for CD19 and CD20**

○ **Viral hepatitis serology**

○ **PAS staining of erythrocytes**

○ **Osmotic fragility test**

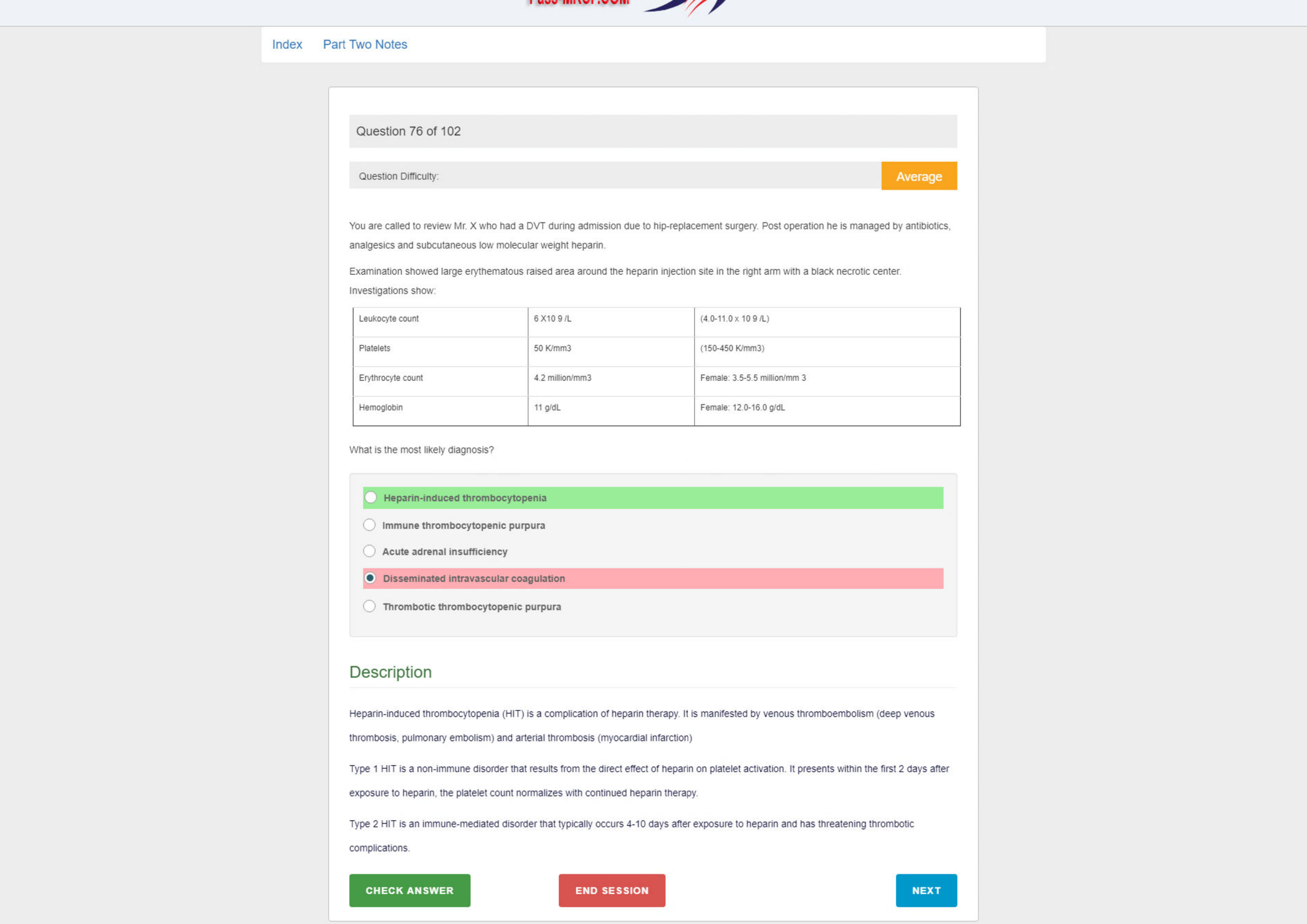
● **Flow cytometry for CD59 and CD55**

Description

This patient has paroxysmal nocturnal hemoglobinuria (PNH). It is a rare, genetically acquired, life-threatening disease (death in 50% of affected patient) of the blood characterized by destruction of red blood cells by the complement system. PNH is manifested by:

- Intravascular hemolytic anemia
- Thrombosis in large vessels (Bud Chiari syndrome in this case)
- Nocturnal hemoglobinuria which is triggered by acidosis during sleep
- Aplastic anemia
- LAB findings of intravascular hemolytic anemia (reticulocytosis, hyperbilirubinemia with decreased haptoglobin)

Flow cytometry is diagnostic. It shows low levels of CD59 and CD55.



Question 76 of 102

Question Difficulty: **Average**

You are called to review Mr. X who had a DVT during admission due to hip-replacement surgery. Post operation he is managed by antibiotics, analgesics and subcutaneous low molecular weight heparin.

Examination showed large erythematous raised area around the heparin injection site in the right arm with a black necrotic center. Investigations show:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	50 K/mm3	(150-450 K/mm3)
Erythrocyte count	4.2 million/mm3	Female: 3.5-5.5 million/mm 3
Hemoglobin	11 g/dL	Female: 12.0-16.0 g/dL

What is the most likely diagnosis?

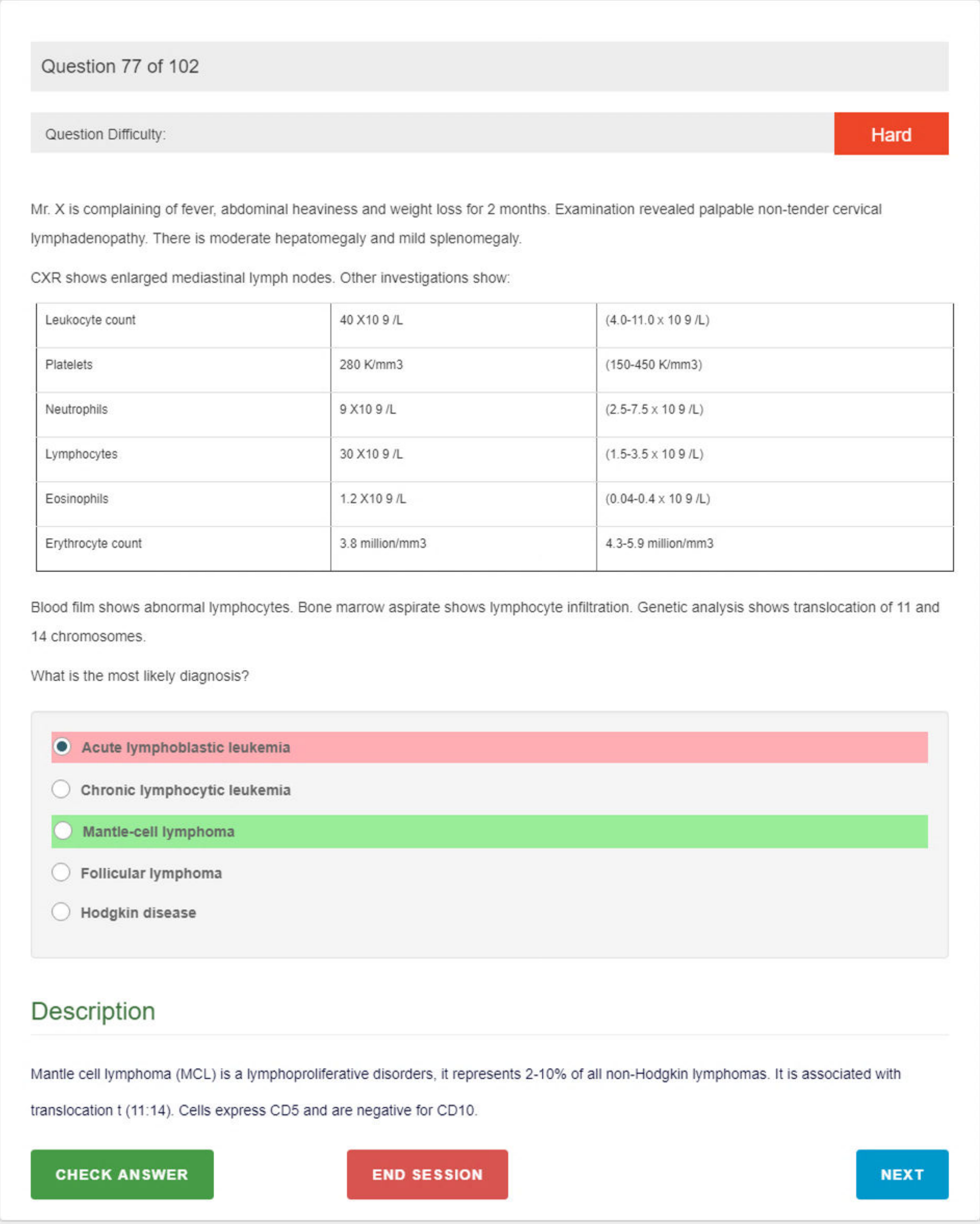
- ○ **Heparin-induced thrombocytopenia**
- ○ **Immune thrombocytopenic purpura**
- ○ **Acute adrenal insufficiency**
- ● **Disseminated intravascular coagulation**
- ○ **Thrombotic thrombocytopenic purpura**

Description

Heparin-induced thrombocytopenia (HIT) is a complication of heparin therapy. It is manifested by venous thromboembolism (deep venous thrombosis, pulmonary embolism) and arterial thrombosis (myocardial infarction)

Type 1 HIT is a non-immune disorder that results from the direct effect of heparin on platelet activation. It presents within the first 2 days after exposure to heparin, the platelet count normalizes with continued heparin therapy.

Type 2 HIT is an immune-mediated disorder that typically occurs 4-10 days after exposure to heparin and has threatening thrombotic complications.



Question 77 of 102

Question Difficulty: **Hard**

Mr. X is complaining of fever, abdominal heaviness and weight loss for 2 months. Examination revealed palpable non-tender cervical lymphadenopathy. There is moderate hepatomegaly and mild splenomegaly.

CXR shows enlarged mediastinal lymph nodes. Other investigations show:

Leukocyte count	40 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	280 K/mm3	(150-450 K/mm3)
Neutrophils	9 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	30 X10 9 /L	(1.5-3.5 x 10 9 /L)
Eosinophils	1.2 X10 9 /L	(0.04-0.4 x 10 9 /L)
Erythrocyte count	3.8 million/mm3	4.3-5.9 million/mm3

Blood film shows abnormal lymphocytes. Bone marrow aspirate shows lymphocyte infiltration. Genetic analysis shows translocation of 11 and 14 chromosomes.

What is the most likely diagnosis?

● **Acute lymphoblastic leukemia**

○ **Chronic lymphocytic leukemia**

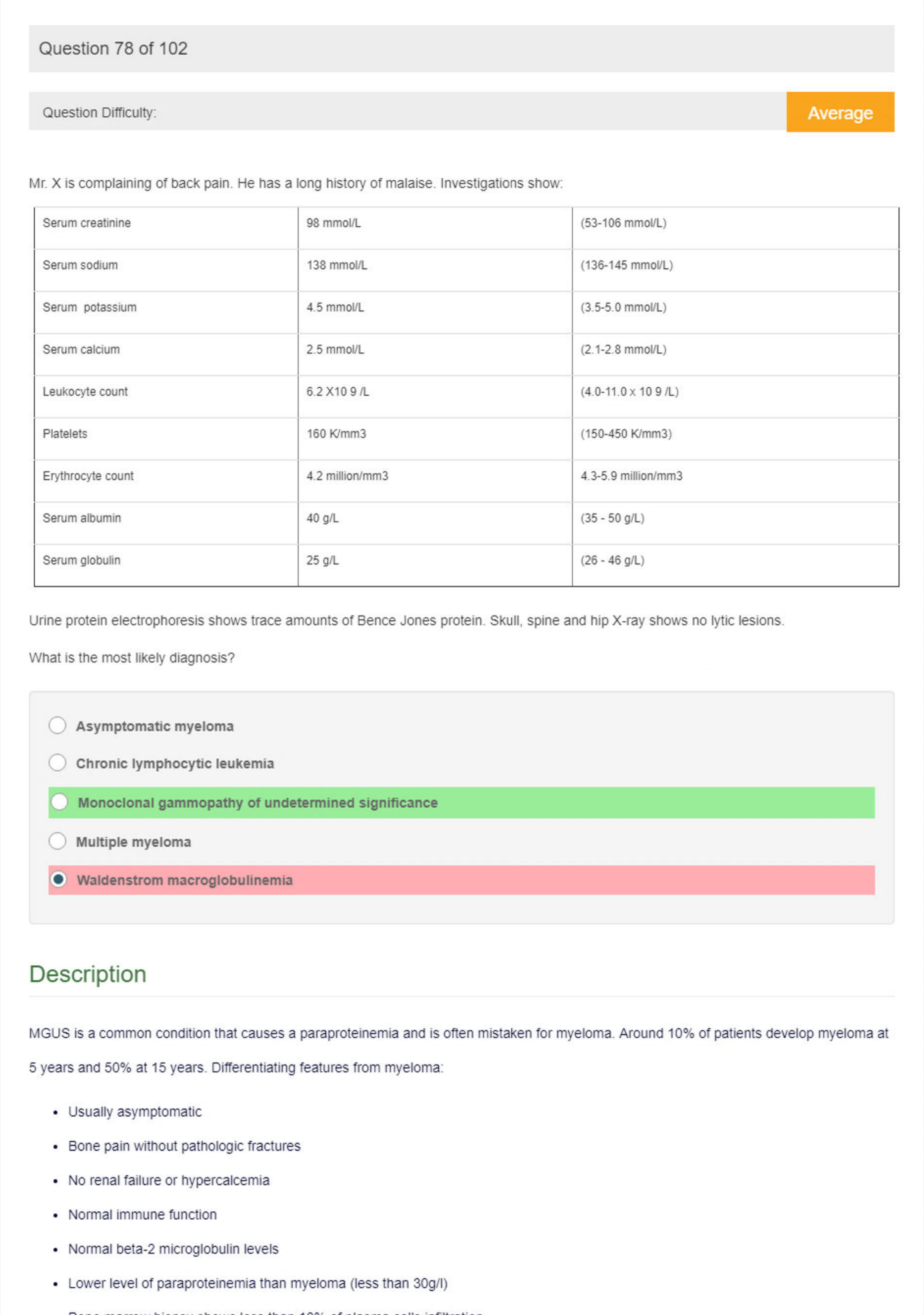
○ **Mantle-cell lymphoma**

○ **Follicular lymphoma**

○ **Hodgkin disease**

Description

Mantle cell lymphoma (MCL) is a lymphoproliferative disorders, it represents 2-10% of all non-Hodgkin lymphomas. It is associated with translocation t (11:14). Cells express CD5 and are negative for CD10.



Question 78 of 102

Question Difficulty: **Average**

Mr. X is complaining of back pain. He has a long history of malaise. Investigations show:

Serum creatinine	98 mmol/L	(53-106 mmol/L)
Serum sodium	138 mmol/L	(136-145 mmol/L)
Serum potassium	4.5 mmol/L	(3.5-5.0 mmol/L)
Serum calcium	2.5 mmol/L	(2.1-2.8 mmol/L)
Leukocyte count	6.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	160 K/mm3	(150-450 K/mm3)
Erythrocyte count	4.2 million/mm3	4.3-5.9 million/mm3
Serum albumin	40 g/L	(35 - 50 g/L)
Serum globulin	25 g/L	(26 - 46 g/L)

Urine protein electrophoresis shows trace amounts of Bence Jones protein. Skull, spine and hip X-ray shows no lytic lesions.

What is the most likely diagnosis?

○ **Asymptomatic myeloma**

○ **Chronic lymphocytic leukemia**

○ **Monoclonal gammopathy of undetermined significance**

○ **Multiple myeloma**

● **Waldenstrom macroglobulinemia**

Description

MGUS is a common condition that causes a paraproteinemia and is often mistaken for myeloma. Around 10% of patients develop myeloma at 5 years and 50% at 15 years. Differentiating features from myeloma:

- Usually asymptomatic
- Bone pain without pathologic fractures
- No renal failure or hypercalcemia
- Normal immune function
- Normal beta-2 microglobulin levels
- Lower level of paraproteinemia than myeloma (less than 30g/l)

Question 79 of 102

Question Difficulty: **Hard**

Mr. X is complaining of fever, abdominal heaviness and weight loss for 2 months. He has no past medical history. Examination revealed palpable non-tender cervical lymphadenopathy. There is moderate hepatomegaly and mild splenomegaly.

CXR shows enlarged mediastinal lymph nodes. Blood culture was negative. Other investigations show:

Bilirubin	25 µmol/L	(2-17 µmol/L)
Serum creatinine	75 mmol/L	(53-106 mmol/L)
Leukocyte count	17 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	280 K/mm3	(150-450 K/mm3)
Neutrophils	15 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	0.6 X10 9 /L	(1.5-3.5 x 10 9 /L)
Eosinophils	1.2 X10 9 /L	(0.04-0.4 x 10 9 /L)
Erythrocyte count	3.8 million/mm3	4.3-5.9 million/mm3
Hemoglobin	11 g/dL	13.5-17.5 g/dL

What is the most likely diagnosis?

Neutrophils	15 X10 9 /L	(2.5-7.5 x 10 9 /L)
Lymphocytes	0.6 X10 9 /L	(1.5-3.5 x 10 9 /L)
Eosinophils	1.2 X10 9 /L	(0.04-0.4 x 10 9 /L)
Erythrocyte count	3.8 million/mm3	4.3-5.9 million/mm3
Hemoglobin	11 g/dL	13.5-17.5 g/dL

What is the most likely diagnosis?

○ **Chronic myeloid leukemia**
○ **Acute lymphoblastic leukemia**
○ **CMV infection**
○ **Hodgkin disease**
● **Infectious mononucleosis**

Description

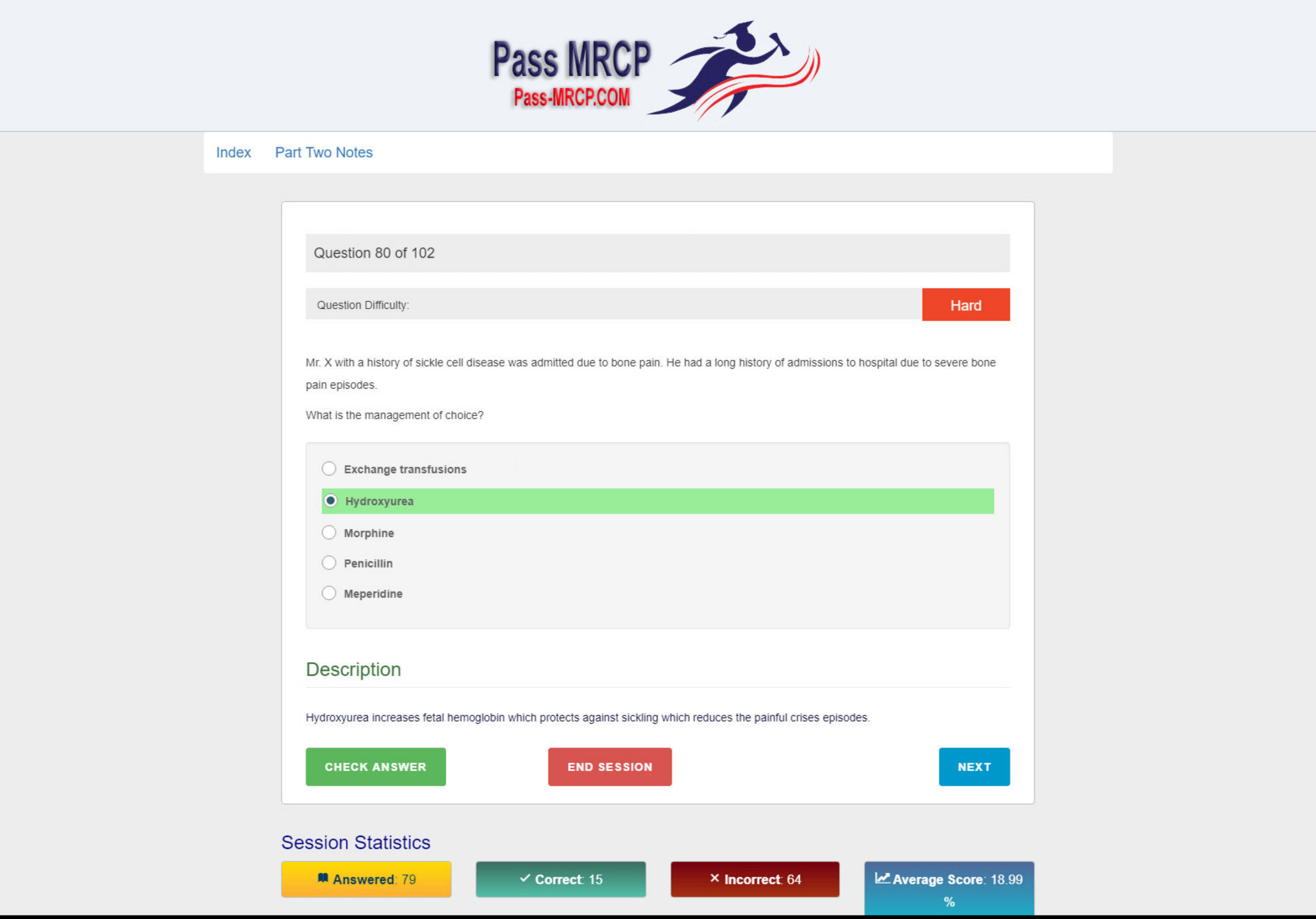
Hodgkin lymphoma is a malignant proliferation of lymphocytes. It is manifested by:

- Asymptomatic painless lymphadenopathy
- Unexplained weight loss, fever and night sweats (B symptoms)
- Pruritus
- Splenomegaly and/or hepatomegaly
- CBC shows anemia, lymphopenia , neutrophillia and eosinophilia

CHECK ANSWER END SESSION NEXT

Session Statistics

Answered: 78 ✓ **Correct**: 15 ✕ **Incorrect**: 63 **Average Score**: 19.23 %



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Question 80 of 102

Question Difficulty: Hard

Mr. X with a history of sickle cell disease was admitted due to bone pain. He had a long history of admissions to hospital due to severe bone pain episodes.

What is the management of choice?

○ Exchange transfusions
● Hydroxyurea
○ Morphine
○ Penicillin
○ Meperidine

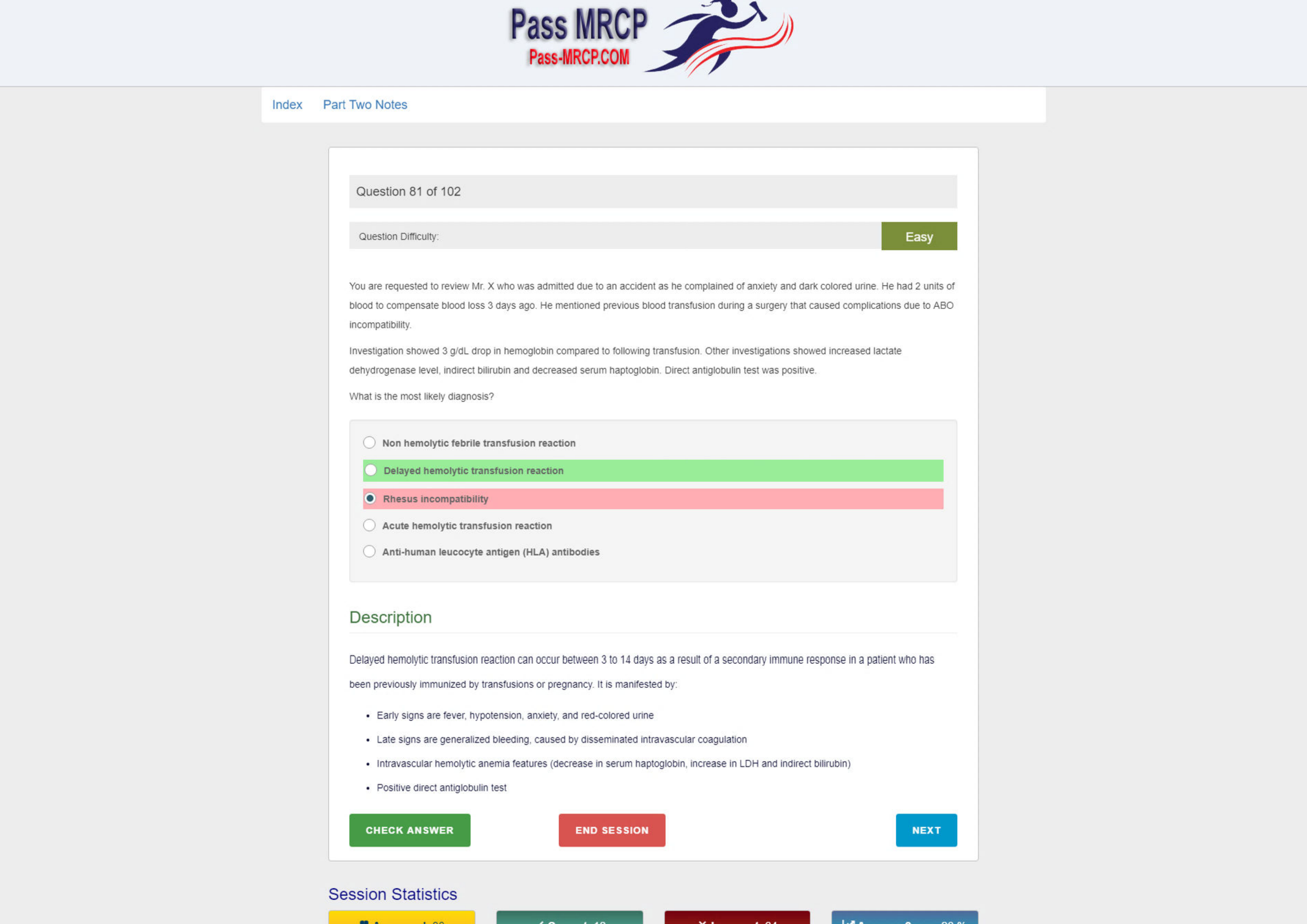
Description

Hydroxyurea increases fetal hemoglobin which protects against sickling which reduces the painful crises episodes.

CHECK ANSWER
END SESSION
NEXT

Session Statistics

Answered: 79
✓ Correct: 15
× Incorrect: 64
Average Score: 18.99 %



Question 81 of 102

Question Difficulty: **Easy**

You are requested to review Mr. X who was admitted due to an accident as he complained of anxiety and dark colored urine. He had 2 units of blood to compensate blood loss 3 days ago. He mentioned previous blood transfusion during a surgery that caused complications due to ABO incompatibility.

Investigation showed 3 g/dL drop in hemoglobin compared to following transfusion. Other investigations showed increased lactate dehydrogenase level, indirect bilirubin and decreased serum haptoglobin. Direct antiglobulin test was positive.

What is the most likely diagnosis?

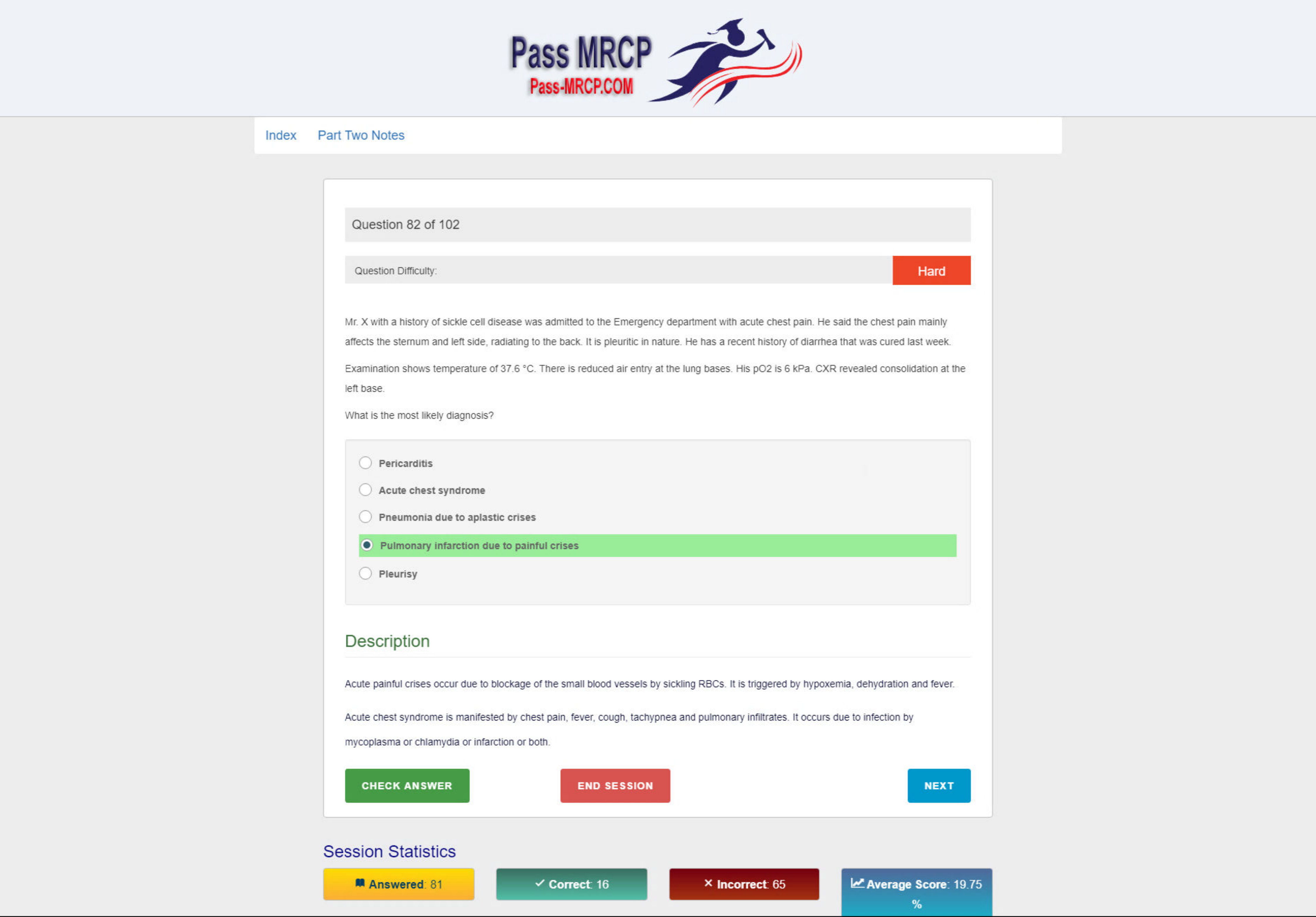
○ **Non hemolytic febrile transfusion reaction**
○ **Delayed hemolytic transfusion reaction**
● **Rhesus incompatibility**
○ **Acute hemolytic transfusion reaction**
○ **Anti-human leucocyte antigen (HLA) antibodies**

Description

Delayed hemolytic transfusion reaction can occur between 3 to 14 days as a result of a secondary immune response in a patient who has been previously immunized by transfusions or pregnancy. It is manifested by:

- Early signs are fever, hypotension, anxiety, and red-colored urine
- Late signs are generalized bleeding, caused by disseminated intravascular coagulation
- Intravascular hemolytic anemia features (decrease in serum haptoglobin, increase in LDH and indirect bilirubin)
- Positive direct antiglobulin test

Session Statistics



Question 82 of 102

Question Difficulty: **Hard**

Mr. X with a history of sickle cell disease was admitted to the Emergency department with acute chest pain. He said the chest pain mainly affects the sternum and left side, radiating to the back. It is pleuritic in nature. He has a recent history of diarrhea that was cured last week.

Examination shows temperature of 37.6 °C. There is reduced air entry at the lung bases. His pO2 is 6 kPa. CXR revealed consolidation at the left base.

What is the most likely diagnosis?

○ **Pericarditis**

○ **Acute chest syndrome**

○ **Pneumonia due to aplastic crises**

● **Pulmonary infarction due to painful crises**

○ **Pleurisy**

Description

Acute painful crises occur due to blockage of the small blood vessels by sickling RBCs. It is triggered by hypoxemia, dehydration and fever.

Acute chest syndrome is manifested by chest pain, fever, cough, tachypnea and pulmonary infiltrates. It occurs due to infection by mycoplasma or chlamydia or infarction or both.

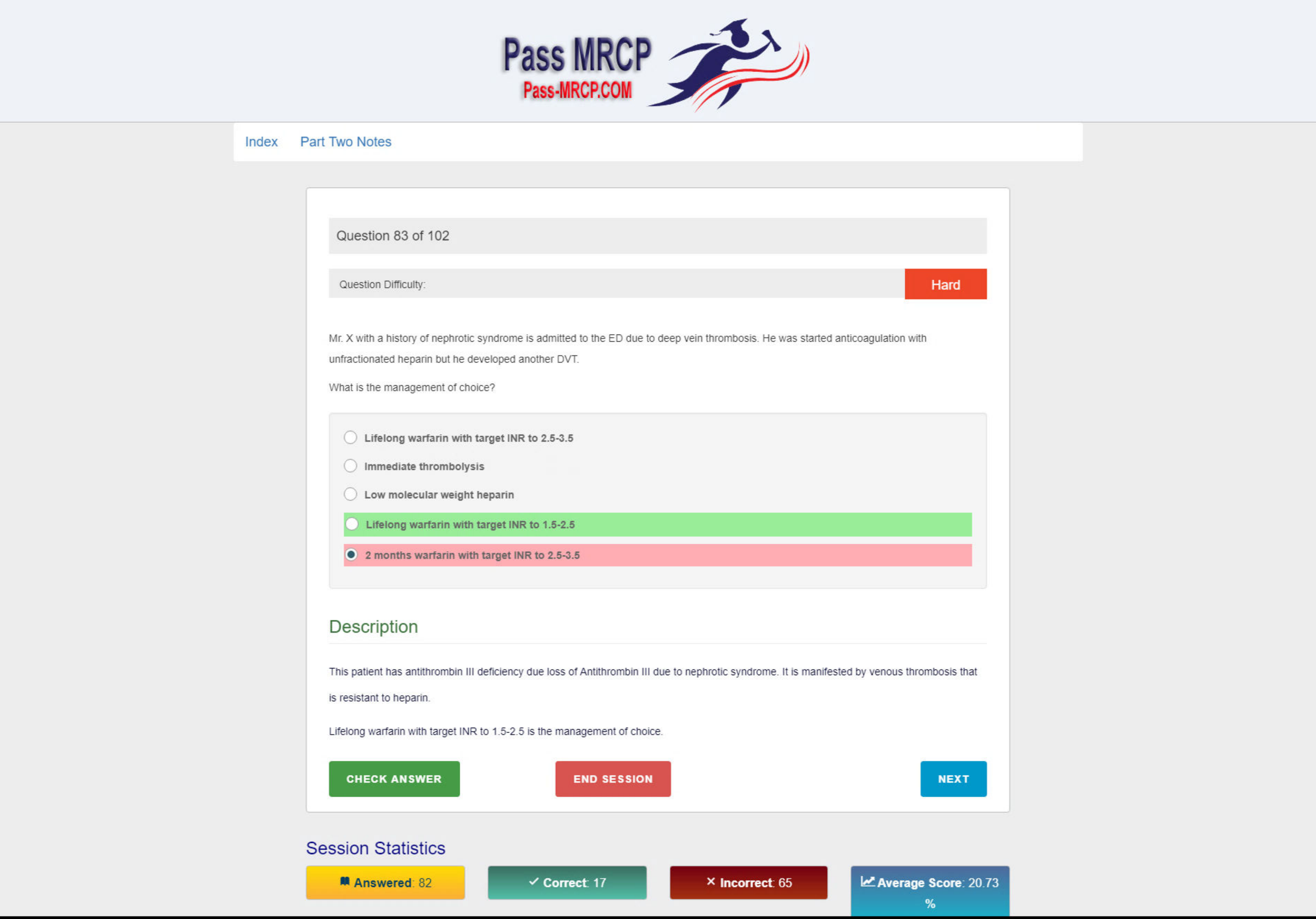
Session Statistics

Answered: 81

✓ **Correct**: 16

✕ **Incorrect**: 65

Average Score: 19.75 %



Question 83 of 102

Question Difficulty: **Hard**

Mr. X with a history of nephrotic syndrome is admitted to the ED due to deep vein thrombosis. He was started anticoagulation with unfractionated heparin but he developed another DVT.

What is the management of choice?

- ○ **Lifelong warfarin with target INR to 2.5-3.5**
- ○ **Immediate thrombolysis**
- ○ **Low molecular weight heparin**
- ○ **Lifelong warfarin with target INR to 1.5-2.5**
- ● **2 months warfarin with target INR to 2.5-3.5**

Description

This patient has antithrombin III deficiency due loss of Antithrombin III due to nephrotic syndrome. It is manifested by venous thrombosis that is resistant to heparin.

Lifelong warfarin with target INR to 1.5-2.5 is the management of choice.

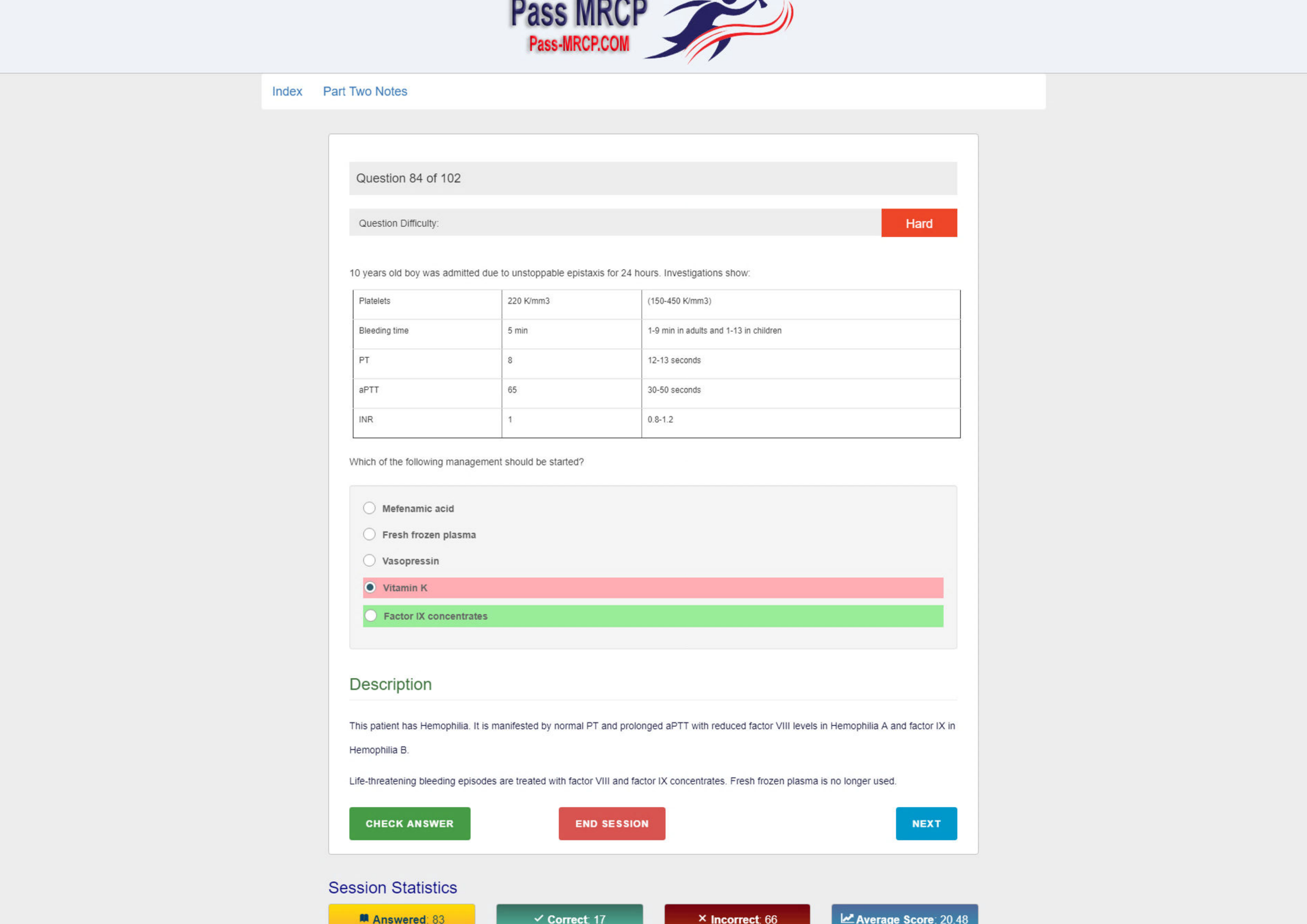
Session Statistics

Answered: 82

✓ **Correct**: 17

× **Incorrect**: 65

Average Score: 20.73 %



Question 84 of 102

Question Difficulty: **Hard**

10 years old boy was admitted due to unstoppable epistaxis for 24 hours. Investigations show:

Platelets	220 K/mm3	(150-450 K/mm3)
Bleeding time	5 min	1-9 min in adults and 1-13 in children
PT	8	12-13 seconds
aPTT	65	30-50 seconds
INR	1	0.8-1.2

Which of the following management should be started?

- ○ **Mefenamic acid**
- ○ **Fresh frozen plasma**
- ○ **Vasopressin**
- ● **Vitamin K**
- ○ **Factor IX concentrates**

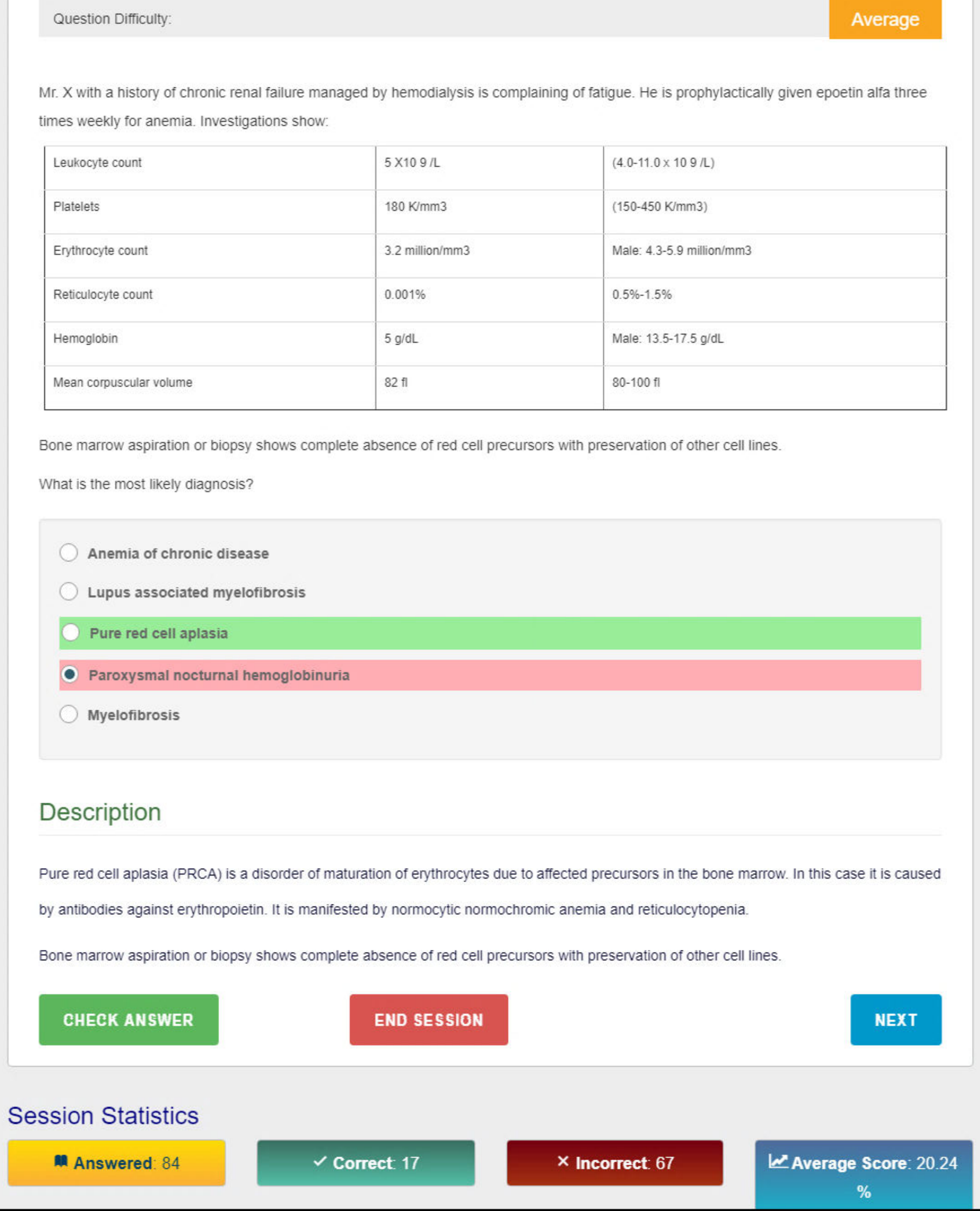
Description

This patient has Hemophilia. It is manifested by normal PT and prolonged aPTT with reduced factor VIII levels in Hemophilia A and factor IX in Hemophilia B.

Life-threatening bleeding episodes are treated with factor VIII and factor IX concentrates. Fresh frozen plasma is no longer used.

Session Statistics

Answered: 83
✓ **Correct**: 17
✕ **Incorrect**: 66
Average Score: 20.48



Question Difficulty: **Average**

Mr. X with a history of chronic renal failure managed by hemodialysis is complaining of fatigue. He is prophylactically given epoetin alfa three times weekly for anemia. Investigations show:

Leukocyte count	5 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	180 K/mm3	(150-450 K/mm3)
Erythrocyte count	3.2 million/mm3	Male: 4.3-5.9 million/mm3
Reticulocyte count	0.001%	0.5%-1.5%
Hemoglobin	5 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	82 fl	80-100 fl

Bone marrow aspiration or biopsy shows complete absence of red cell precursors with preservation of other cell lines.

What is the most likely diagnosis?

- ○ **Anemia of chronic disease**
- ○ **Lupus associated myelofibrosis**
- ○ **Pure red cell aplasia**
- ● **Paroxysmal nocturnal hemoglobinuria**
- ○ **Myelofibrosis**

Description

Pure red cell aplasia (PRCA) is a disorder of maturation of erythrocytes due to affected precursors in the bone marrow. In this case it is caused by antibodies against erythropoietin. It is manifested by normocytic normochromic anemia and reticulocytopenia.

Bone marrow aspiration or biopsy shows complete absence of red cell precursors with preservation of other cell lines.

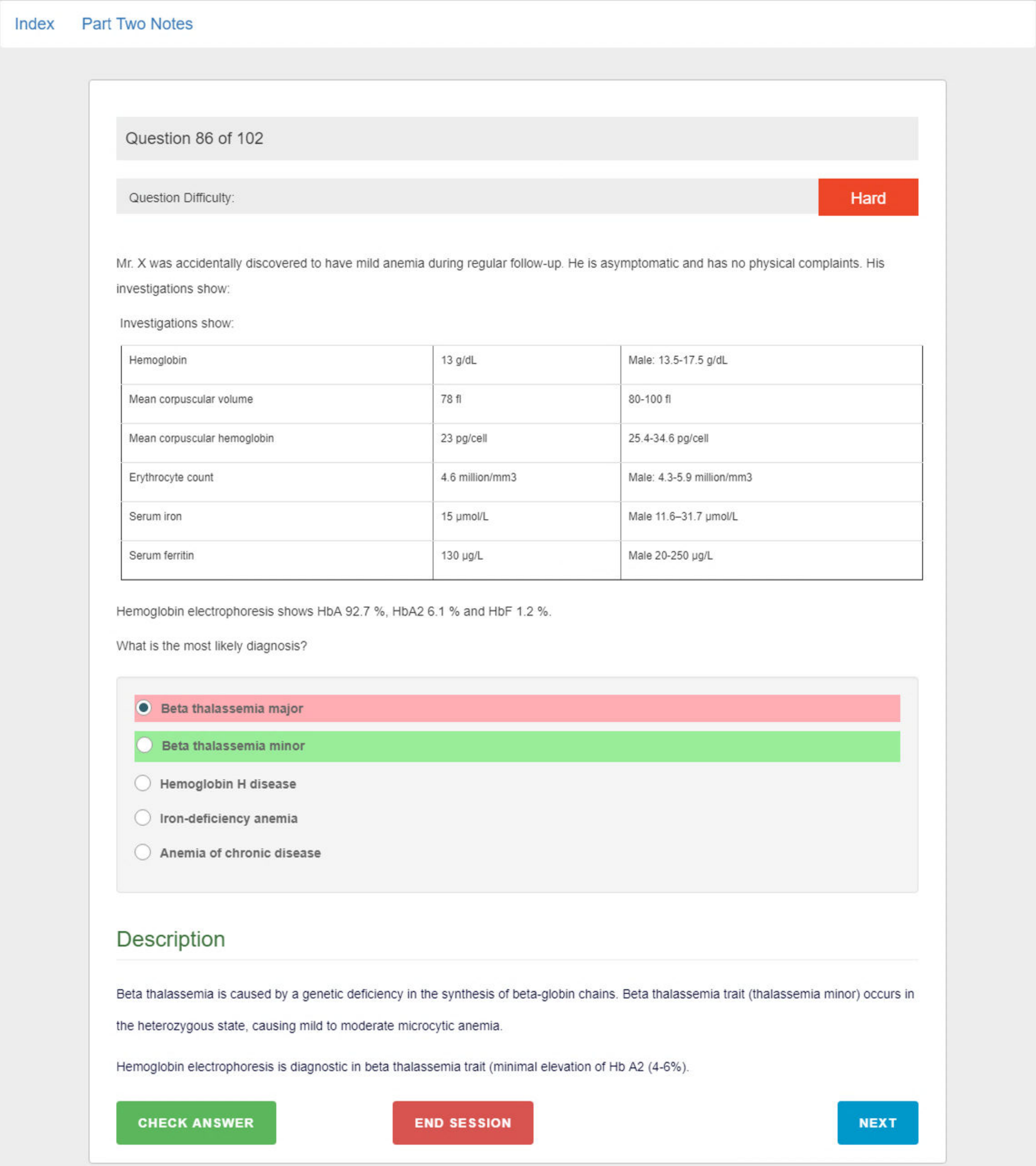
Session Statistics

Answered: 84

✓ **Correct**: 17

✕ **Incorrect**: 67

Average Score: 20.24 %



Question 86 of 102

Question Difficulty: **Hard**

Mr. X was accidentally discovered to have mild anemia during regular follow-up. He is asymptomatic and has no physical complaints. His investigations show:

Investigations show:

Hemoglobin	13 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	78 fl	80-100 fl
Mean corpuscular hemoglobin	23 pg/cell	25.4-34.6 pg/cell
Erythrocyte count	4.6 million/mm3	Male: 4.3-5.9 million/mm3
Serum iron	15 µmol/L	Male 11.6–31.7 µmol/L
Serum ferritin	130 µg/L	Male 20-250 µg/L

Hemoglobin electrophoresis shows HbA 92.7 %, HbA2 6.1 % and HbF 1.2 %.

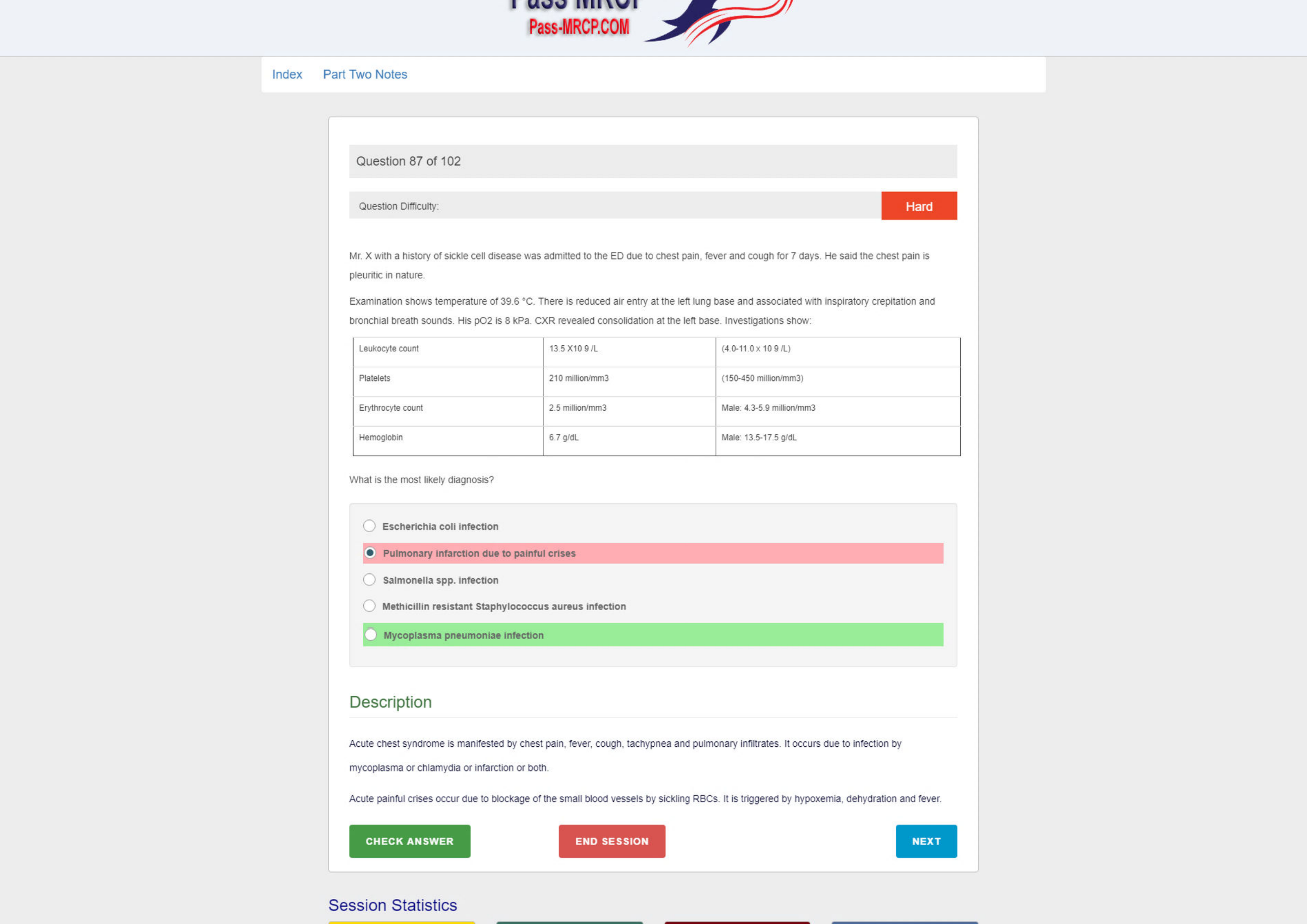
What is the most likely diagnosis?

- ● **Beta thalassemia major**
- ○ **Beta thalassemia minor**
- ○ **Hemoglobin H disease**
- ○ **Iron-deficiency anemia**
- ○ **Anemia of chronic disease**

Description

Beta thalassemia is caused by a genetic deficiency in the synthesis of beta-globin chains. Beta thalassemia trait (thalassemia minor) occurs in the heterozygous state, causing mild to moderate microcytic anemia.

Hemoglobin electrophoresis is diagnostic in beta thalassemia trait (minimal elevation of Hb A2 (4-6%).



Question 87 of 102

Question Difficulty: **Hard**

Mr. X with a history of sickle cell disease was admitted to the ED due to chest pain, fever and cough for 7 days. He said the chest pain is pleuritic in nature.

Examination shows temperature of 39.6 °C. There is reduced air entry at the left lung base and associated with inspiratory crepitation and bronchial breath sounds. His pO2 is 8 kPa. CXR revealed consolidation at the left base. Investigations show:

Leukocyte count	13.5 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	210 million/mm3	(150-450 million/mm3)
Erythrocyte count	2.5 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	6.7 g/dL	Male: 13.5-17.5 g/dL

What is the most likely diagnosis?

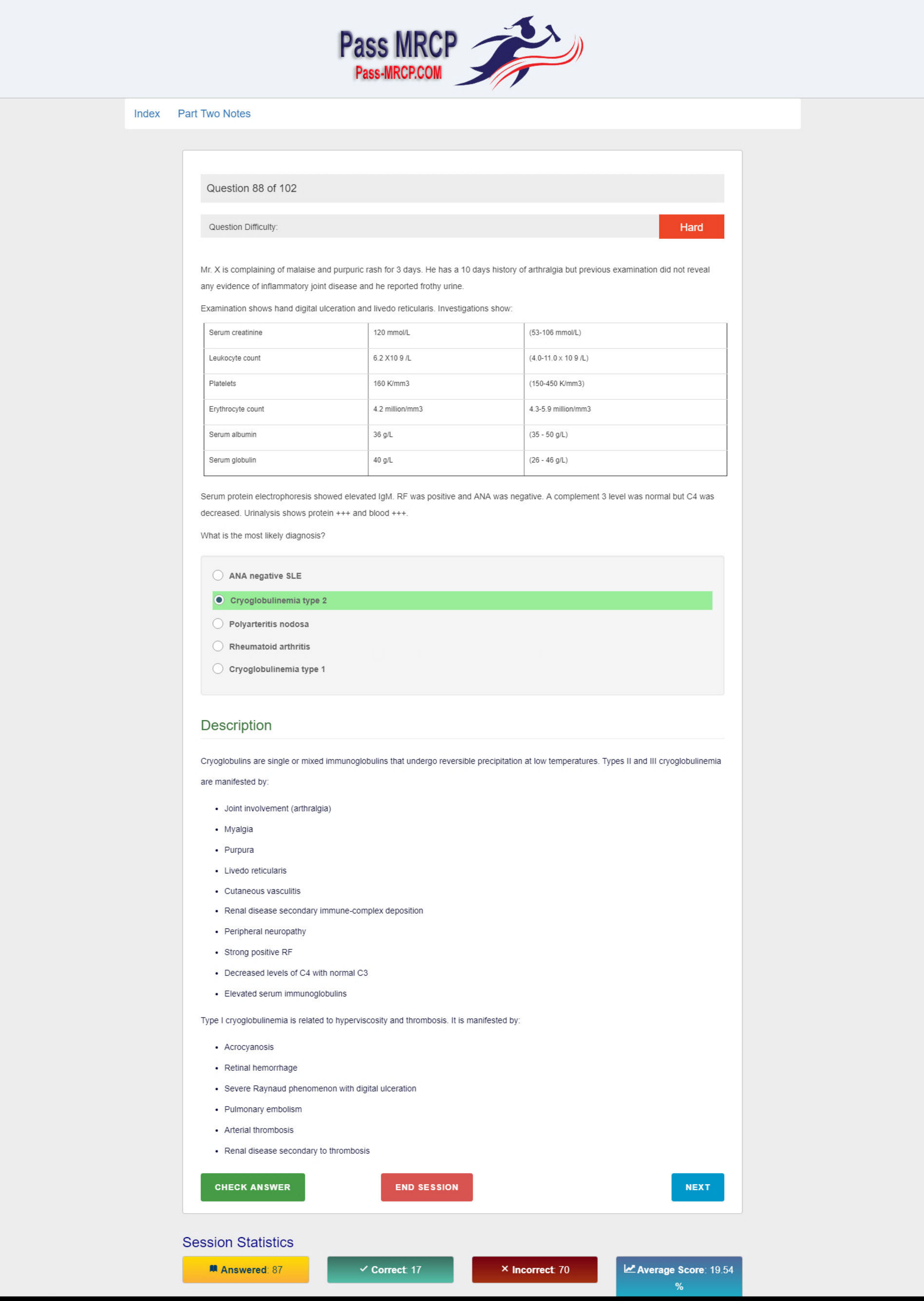
- ○ **Escherichia coli infection**
- ● **Pulmonary infarction due to painful crises**
- ○ **Salmonella spp. infection**
- ○ **Methicillin resistant Staphylococcus aureus infection**
- ○ **Mycoplasma pneumoniae infection**

Description

Acute chest syndrome is manifested by chest pain, fever, cough, tachypnea and pulmonary infiltrates. It occurs due to infection by mycoplasma or chlamydia or infarction or both.

Acute painful crises occur due to blockage of the small blood vessels by sickling RBCs. It is triggered by hypoxemia, dehydration and fever.

Session Statistics



Question 88 of 102

Question Difficulty: **Hard**

Mr. X is complaining of malaise and purpuric rash for 3 days. He has a 10 days history of arthralgia but previous examination did not reveal any evidence of inflammatory joint disease and he reported frothy urine.

Examination shows hand digital ulceration and livedo reticularis. Investigations show:

Serum creatinine	120 mmol/L	(53-106 mmol/L)
Leukocyte count	6.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	160 K/mm3	(150-450 K/mm3)
Erythrocyte count	4.2 million/mm3	4.3-5.9 million/mm3
Serum albumin	36 g/L	(35 - 50 g/L)
Serum globulin	40 g/L	(26 - 46 g/L)

Serum protein electrophoresis showed elevated IgM. RF was positive and ANA was negative. A complement 3 level was normal but C4 was decreased. Urinalysis shows protein +++ and blood +++.

What is the most likely diagnosis?

○ **ANA negative SLE**
● **Cryoglobulinemia type 2**
○ **Polyarteritis nodosa**
○ **Rheumatoid arthritis**
○ **Cryoglobulinemia type 1**

Description

Cryoglobulins are single or mixed immunoglobulins that undergo reversible precipitation at low temperatures. Types II and III cryoglobulinemia are manifested by:

- Joint involvement (arthralgia)
- Myalgia
- Purpura
- Livedo reticularis
- Cutaneous vasculitis
- Renal disease secondary immune-complex deposition
- Peripheral neuropathy
- Strong positive RF
- Decreased levels of C4 with normal C3
- Elevated serum immunoglobulins

Type I cryoglobulinemia is related to hyperviscosity and thrombosis. It is manifested by:

- Acrocyanosis
- Retinal hemorrhage
- Severe Raynaud phenomenon with digital ulceration
- Pulmonary embolism
- Arterial thrombosis
- Renal disease secondary to thrombosis

Session Statistics

Answered: 87
✓ **Correct**: 17
✕ **Incorrect**: 70
Average Score: 19.54 %

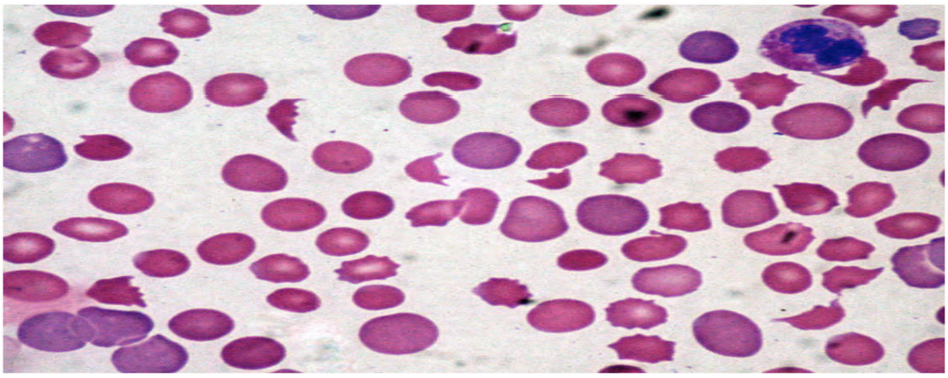
Question 89 of 102

Question Difficulty: Hard

Mr. X is complaining of bloody diarrhea, fever and abdominal pain for 3 days. Investigations show

Leukocyte count	15 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	60 million/mm3	(150-450 million/mm3)
Erythrocyte count	4.2 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	10.2 g/dL	Male: 13.5-17.5 g/dL
Serum creatinine	150 mmol/L	(53-106 mmol/L)
PT	16 seconds	12-13 seconds
Bilirubin	42 µmol/L	(2-17 µmol/L)
ALT	35 U/L	(8-20 U/L)

His blood film is shown in the image.



What is the most likely causative organism of his illness?

○ TB
○ Salmonella
○ Campylobacter
○ Giardiasis
● E. coli

Description

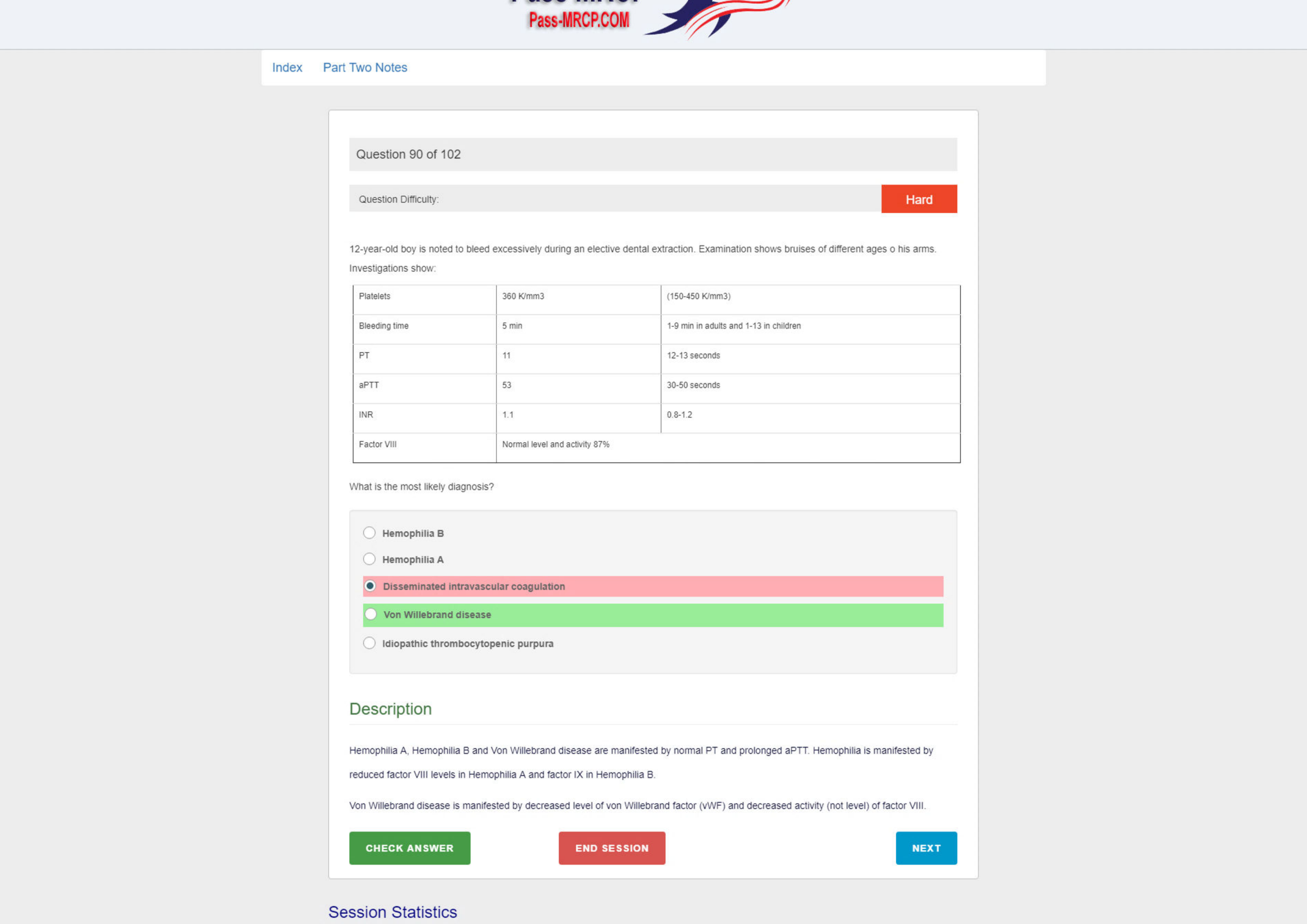
This patient has hemolytic-uremic syndrome (HUS). It is characterized by progressive renal failure that is associated with microangiopathic (Coombs-negative) hemolytic anemia and thrombocytopenia. HUS is usually preceded by infectious disease (usually diarrhea) especially Shigella dysenteriae and E coli 0157:H7. HUS is manifested by:

- Acute renal failure
- CBC shows anemia, thrombocytopenia and schistocytes (fragmented RBCs shown in the image)
- Coombs-negative intravascular hemolytic anemia

CHECK ANSWER END SESSION NEXT

Session Statistics

Answered: 88 ✓ **Correct**: 18 ✕ **Incorrect**: 70 **Average Score**: 20.45 %



Question 90 of 102

Question Difficulty: Hard

12-year-old boy is noted to bleed excessively during an elective dental extraction. Examination shows bruises of different ages o his arms.

Investigations show:

Platelets	360 K/mm3	(150-450 K/mm3)
Bleeding time	5 min	1-9 min in adults and 1-13 in children
PT	11	12-13 seconds
aPTT	53	30-50 seconds
INR	1.1	0.8-1.2
Factor VIII	Normal level and activity 87%	

What is the most likely diagnosis?

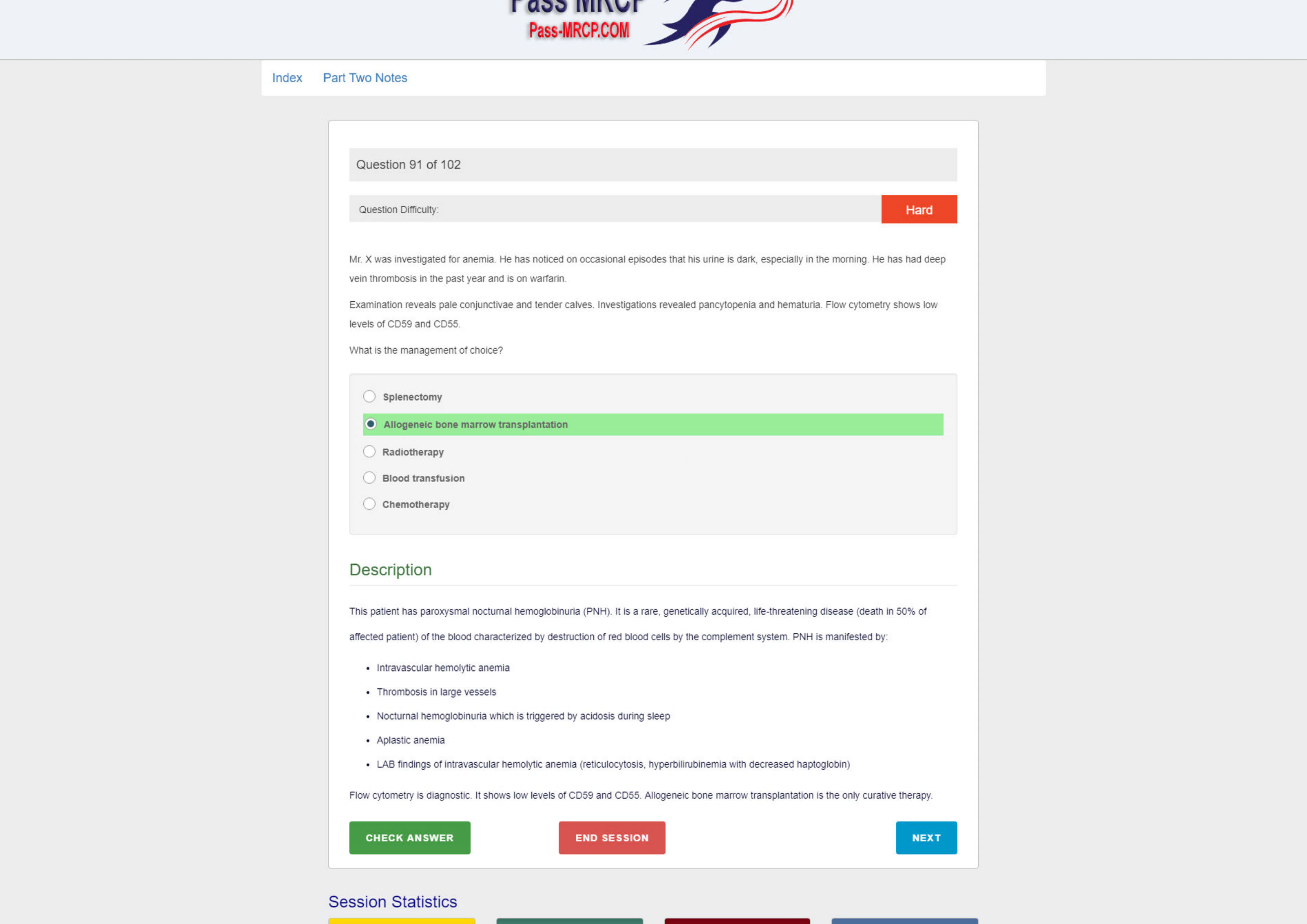
- ○ **Hemophilia B**
- ○ **Hemophilia A**
- ● **Disseminated intravascular coagulation**
- ○ **Von Willebrand disease**
- ○ **Idiopathic thrombocytopenic purpura**

Description

Hemophilia A, Hemophilia B and Von Willebrand disease are manifested by normal PT and prolonged aPTT. Hemophilia is manifested by reduced factor VIII levels in Hemophilia A and factor IX in Hemophilia B.

Von Willebrand disease is manifested by decreased level of von Willebrand factor (vWF) and decreased activity (not level) of factor VIII.

Session Statistics



Question 91 of 102

Question Difficulty: Hard

Mr. X was investigated for anemia. He has noticed on occasional episodes that his urine is dark, especially in the morning. He has had deep vein thrombosis in the past year and is on warfarin.

Examination reveals pale conjunctivae and tender calves. Investigations revealed pancytopenia and hematuria. Flow cytometry shows low levels of CD59 and CD55.

What is the management of choice?

○ **Splenectomy**
● **Allogeneic bone marrow transplantation**
○ **Radiotherapy**
○ **Blood transfusion**
○ **Chemotherapy**

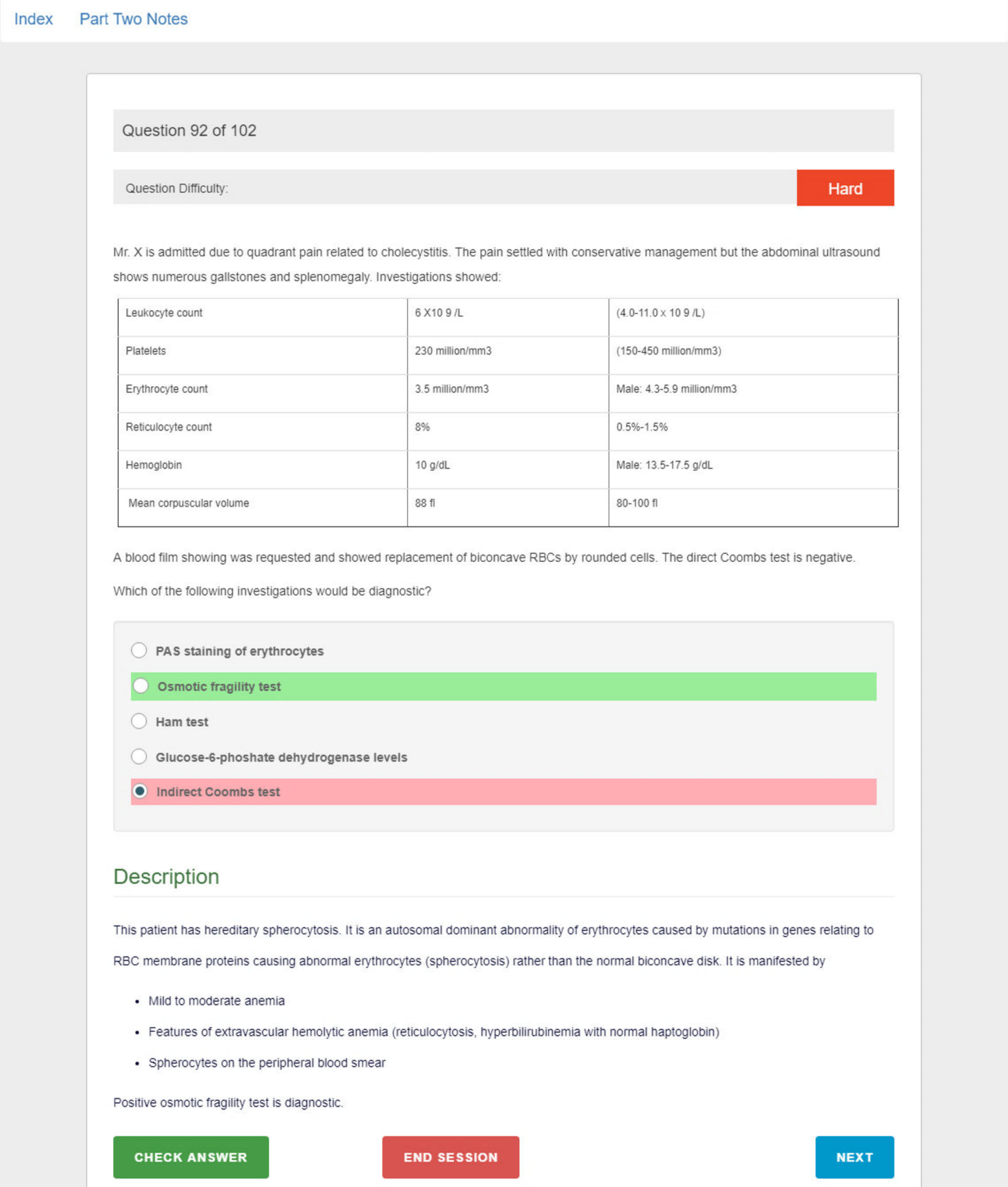
Description

This patient has paroxysmal nocturnal hemoglobinuria (PNH). It is a rare, genetically acquired, life-threatening disease (death in 50% of affected patient) of the blood characterized by destruction of red blood cells by the complement system. PNH is manifested by:

- Intravascular hemolytic anemia
- Thrombosis in large vessels
- Nocturnal hemoglobinuria which is triggered by acidosis during sleep
- Aplastic anemia
- LAB findings of intravascular hemolytic anemia (reticulocytosis, hyperbilirubinemia with decreased haptoglobin)

Flow cytometry is diagnostic. It shows low levels of CD59 and CD55. Allogeneic bone marrow transplantation is the only curative therapy.

Session Statistics



Question 92 of 102

Mr. X is admitted due to quadrant pain related to cholecystitis. The pain settled with conservative management but the abdominal ultrasound shows numerous gallstones and splenomegaly. Investigations showed:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	230 million/mm3	(150-450 million/mm3)
Erythrocyte count	3.5 million/mm3	Male: 4.3-5.9 million/mm3
Reticulocyte count	8%	0.5%-1.5%
Hemoglobin	10 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	88 fl	80-100 fl

A blood film showing was requested and showed replacement of biconcave RBCs by rounded cells. The direct Coombs test is negative.

Which of the following investigations would be diagnostic?

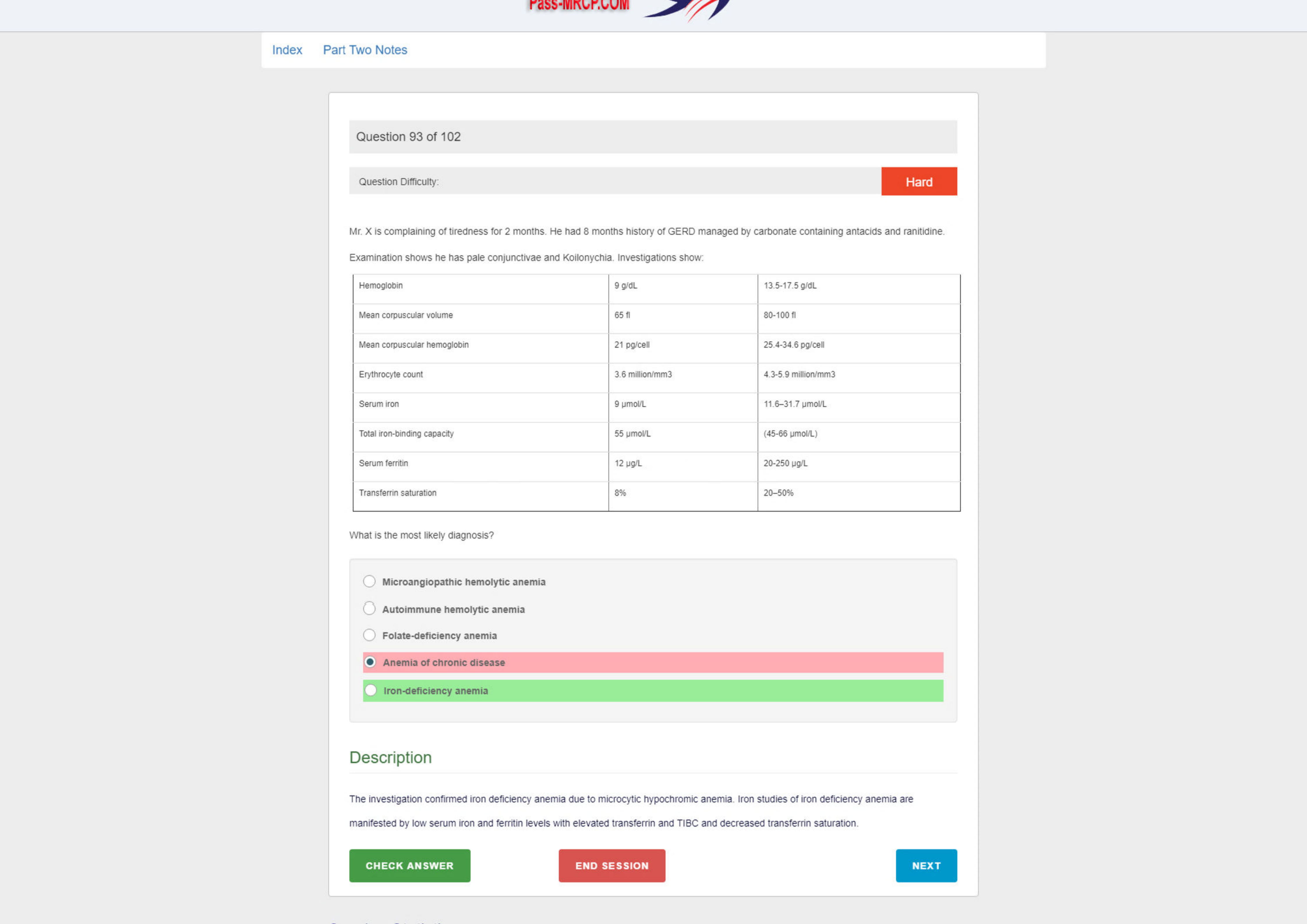
- ○ **PAS staining of erythrocytes**
- ○ **Osmotic fragility test**
- ○ **Ham test**
- ○ **Glucose-6-phoshate dehydrogenase levels**
- ● **Indirect Coombs test**

Description

This patient has hereditary spherocytosis. It is an autosomal dominant abnormality of erythrocytes caused by mutations in genes relating to RBC membrane proteins causing abnormal erythrocytes (spherocytosis) rather than the normal biconcave disk. It is manifested by

- Mild to moderate anemia
- Features of extravascular hemolytic anemia (reticulocytosis, hyperbilirubinemia with normal haptoglobin)
- Spherocytes on the peripheral blood smear

Positive osmotic fragility test is diagnostic.



Question 93 of 102

Question Difficulty: Hard

Mr. X is complaining of tiredness for 2 months. He had 8 months history of GERD managed by carbonate containing antacids and ranitidine.

Examination shows he has pale conjunctivae and Koilonychia. Investigations show:

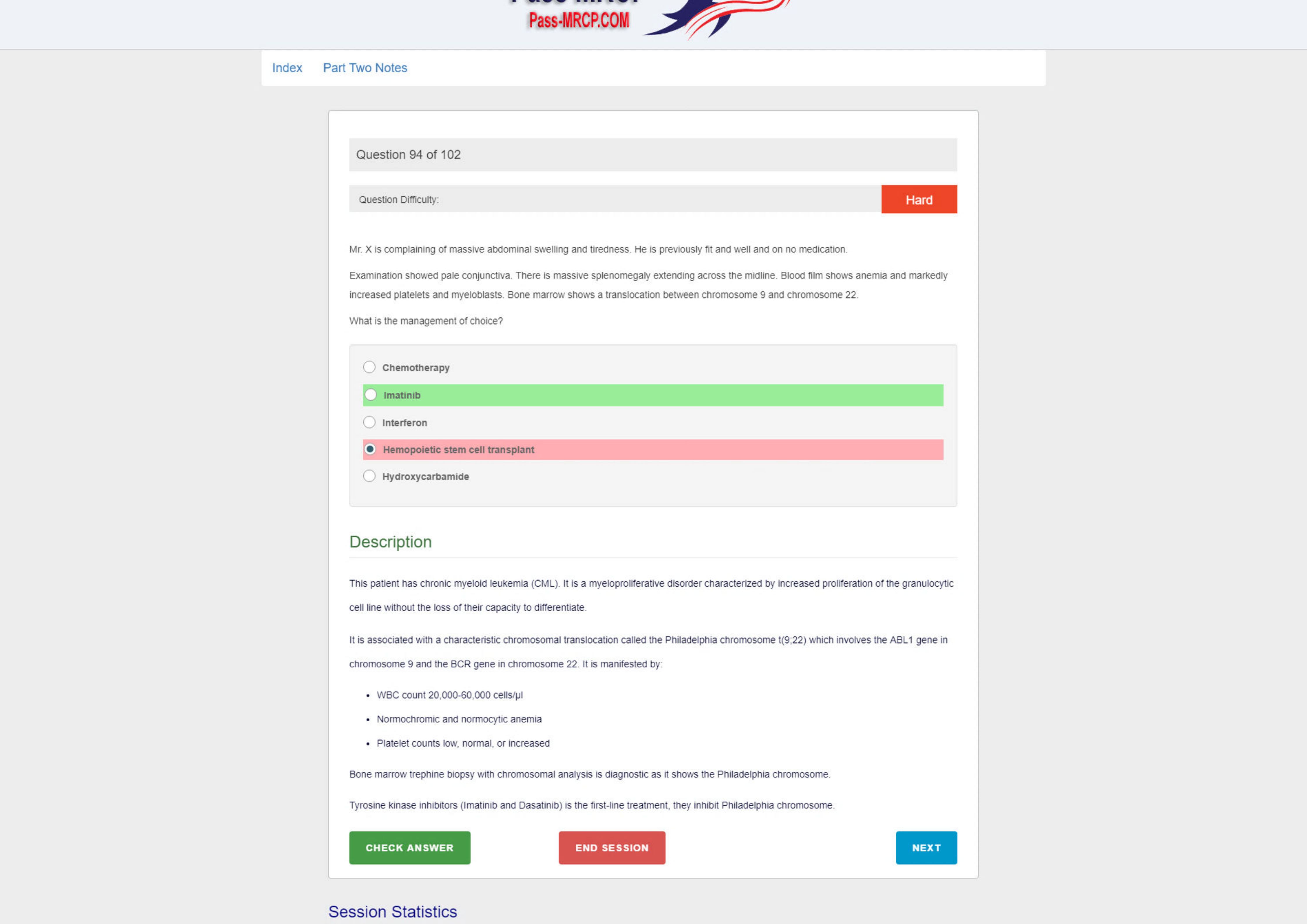
Hemoglobin	9 g/dL	13.5-17.5 g/dL
Mean corpuscular volume	65 fl	80-100 fl
Mean corpuscular hemoglobin	21 pg/cell	25.4-34.6 pg/cell
Erythrocyte count	3.6 million/mm3	4.3-5.9 million/mm3
Serum iron	9 µmol/L	11.6–31.7 µmol/L
Total iron-binding capacity	55 µmol/L	(45-66 µmol/L)
Serum ferritin	12 µg/L	20-250 µg/L
Transferrin saturation	8%	20–50%

What is the most likely diagnosis?

- ○ **Microangiopathic hemolytic anemia**
- ○ **Autoimmune hemolytic anemia**
- ○ **Folate-deficiency anemia**
- ● **Anemia of chronic disease**
- ○ **Iron-deficiency anemia**

Description

The investigation confirmed iron deficiency anemia due to microcytic hypochromic anemia. Iron studies of iron deficiency anemia are manifested by low serum iron and ferritin levels with elevated transferrin and TIBC and decreased transferrin saturation.



Question 94 of 102

Question Difficulty: **Hard**

Mr. X is complaining of massive abdominal swelling and tiredness. He is previously fit and well and on no medication.

Examination showed pale conjunctiva. There is massive splenomegaly extending across the midline. Blood film shows anemia and markedly increased platelets and myeloblasts. Bone marrow shows a translocation between chromosome 9 and chromosome 22.

What is the management of choice?

○ **Chemotherapy**

○ **Imatinib**

○ **Interferon**

● **Hemopoietic stem cell transplant**

○ **Hydroxycarbamide**

Description

This patient has chronic myeloid leukemia (CML). It is a myeloproliferative disorder characterized by increased proliferation of the granulocytic cell line without the loss of their capacity to differentiate.

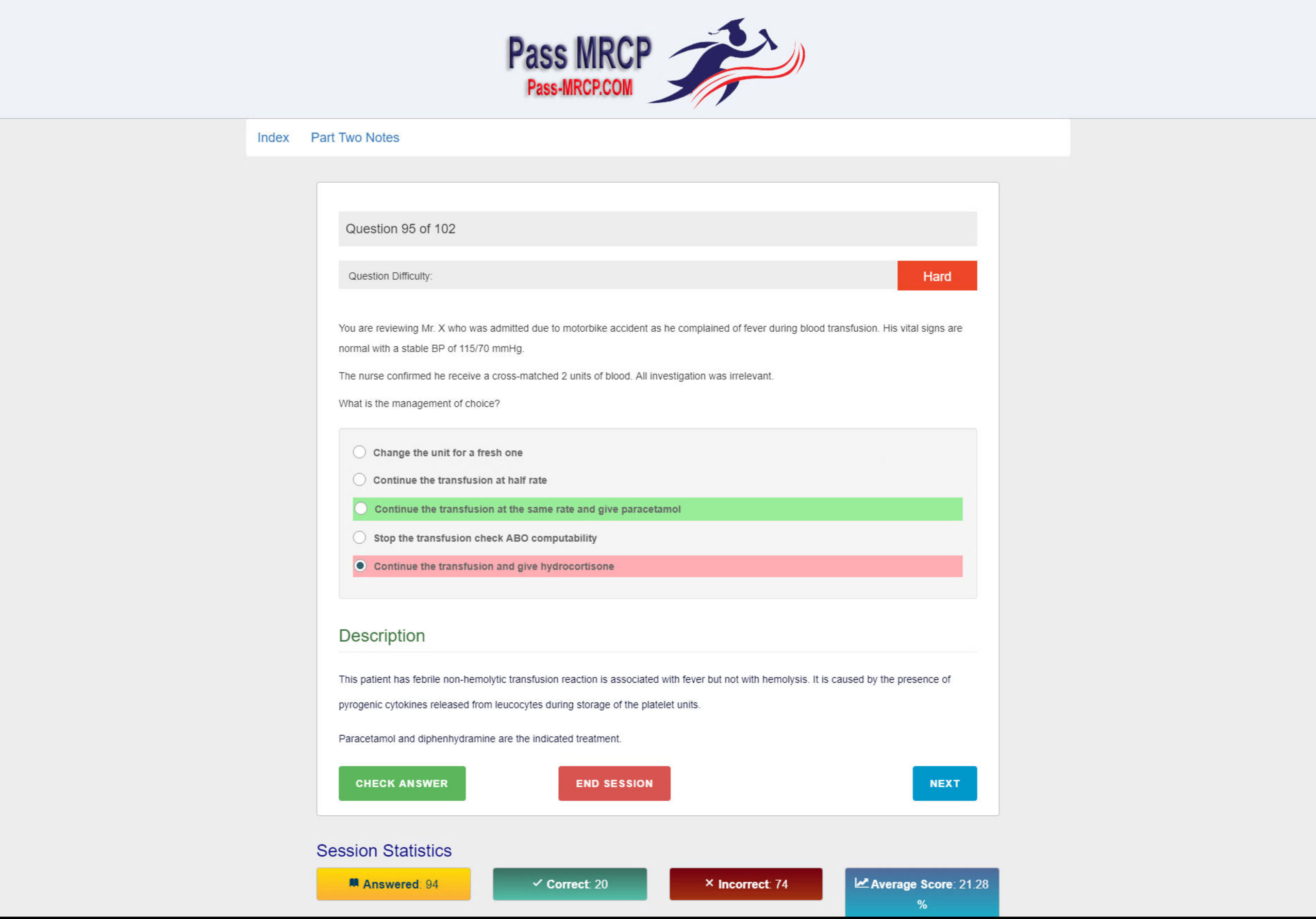
It is associated with a characteristic chromosomal translocation called the Philadelphia chromosome t(9;22) which involves the ABL1 gene in chromosome 9 and the BCR gene in chromosome 22. It is manifested by:

- WBC count 20,000-60,000 cells/μl
- Normochromic and normocytic anemia
- Platelet counts low, normal, or increased

Bone marrow trephine biopsy with chromosomal analysis is diagnostic as it shows the Philadelphia chromosome.

Tyrosine kinase inhibitors (Imatinib and Dasatinib) is the first-line treatment, they inhibit Philadelphia chromosome.

Session Statistics



Question 95 of 102

Question Difficulty: **Hard**

You are reviewing Mr. X who was admitted due to motorbike accident as he complained of fever during blood transfusion. His vital signs are normal with a stable BP of 115/70 mmHg.

The nurse confirmed he receive a cross-matched 2 units of blood. All investigation was irrelevant.

What is the management of choice?

- ○ **Change the unit for a fresh one**
- ○ **Continue the transfusion at half rate**
- ○ **Continue the transfusion at the same rate and give paracetamol**
- ○ **Stop the transfusion check ABO computability**
- ● **Continue the transfusion and give hydrocortisone**

Description

This patient has febrile non-hemolytic transfusion reaction is associated with fever but not with hemolysis. It is caused by the presence of pyrogenic cytokines released from leucocytes during storage of the platelet units.

Paracetamol and diphenhydramine are the indicated treatment.

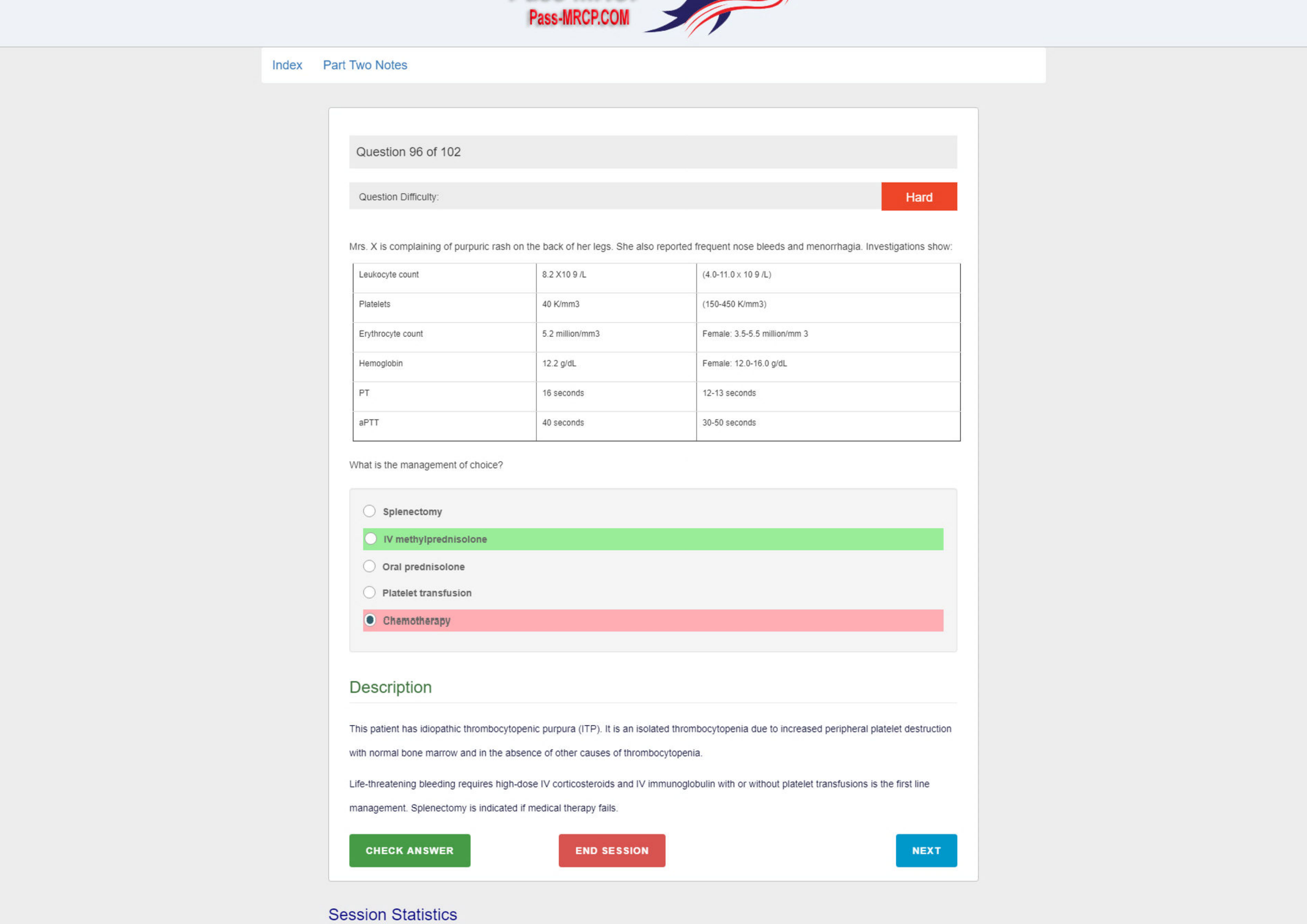
Session Statistics

Answered: 94

✓ **Correct**: 20

✕ **Incorrect**: 74

Average Score: 21.28 %



Question 96 of 102

Question Difficulty: Hard

Mrs. X is complaining of purpuric rash on the back of her legs. She also reported frequent nose bleeds and menorrhagia. Investigations show:

Leukocyte count	8.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	40 K/mm3	(150-450 K/mm3)
Erythrocyte count	5.2 million/mm3	Female: 3.5-5.5 million/mm 3
Hemoglobin	12.2 g/dL	Female: 12.0-16.0 g/dL
PT	16 seconds	12-13 seconds
aPTT	40 seconds	30-50 seconds

What is the management of choice?

○ **Splenectomy**

○ **IV methylprednisolone**

○ **Oral prednisolone**

○ **Platelet transfusion**

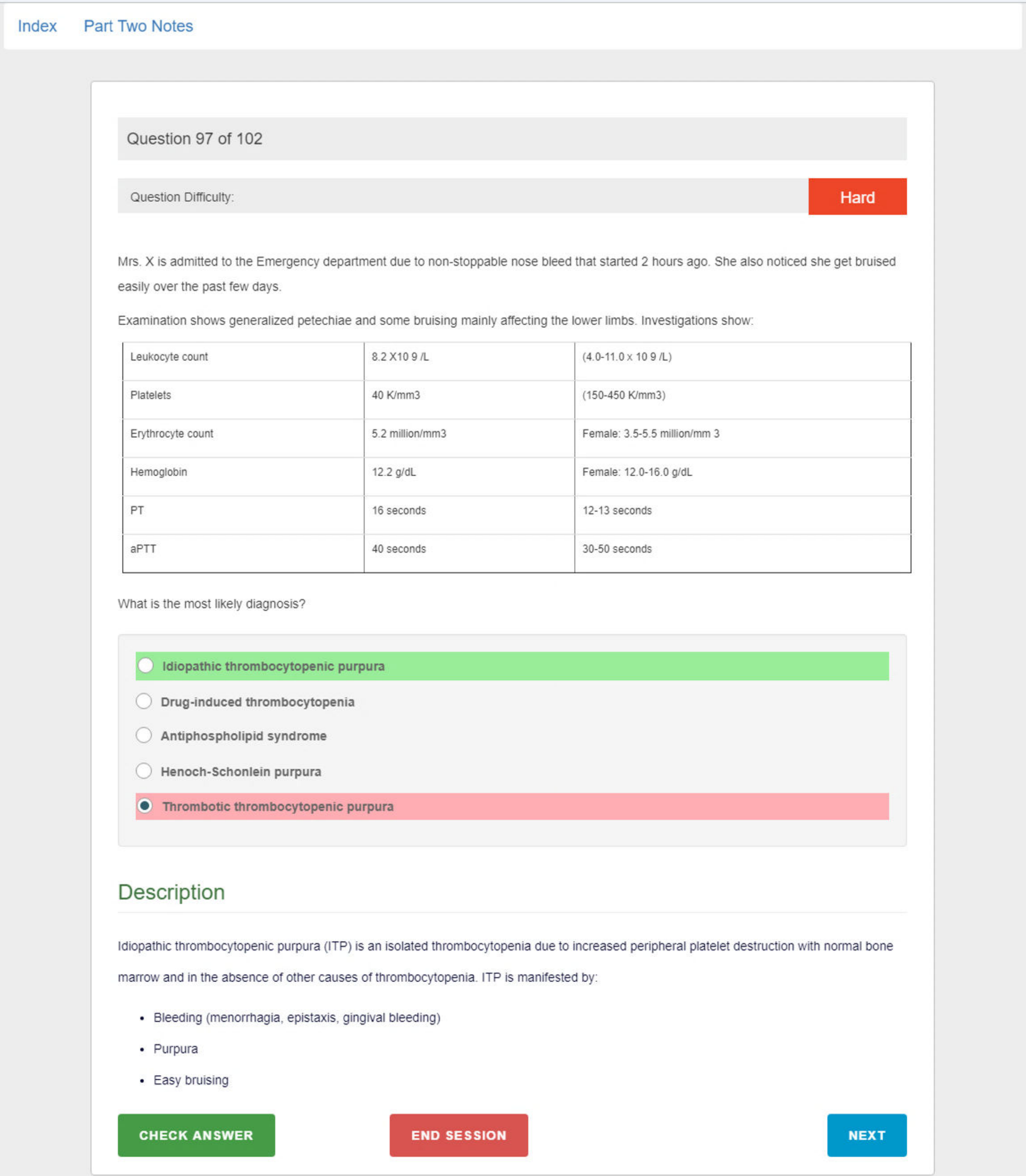
● **Chemotherapy**

Description

This patient has idiopathic thrombocytopenic purpura (ITP). It is an isolated thrombocytopenia due to increased peripheral platelet destruction with normal bone marrow and in the absence of other causes of thrombocytopenia.

Life-threatening bleeding requires high-dose IV corticosteroids and IV immunoglobulin with or without platelet transfusions is the first line management. Splenectomy is indicated if medical therapy fails.

Session Statistics



Question 97 of 102

Question Difficulty: **Hard**

Mrs. X is admitted to the Emergency department due to non-stoppable nose bleed that started 2 hours ago. She also noticed she get bruised easily over the past few days.

Examination shows generalized petechiae and some bruising mainly affecting the lower limbs. Investigations show:

Leukocyte count	8.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	40 K/mm3	(150-450 K/mm3)
Erythrocyte count	5.2 million/mm3	Female: 3.5-5.5 million/mm 3
Hemoglobin	12.2 g/dL	Female: 12.0-16.0 g/dL
PT	16 seconds	12-13 seconds
aPTT	40 seconds	30-50 seconds

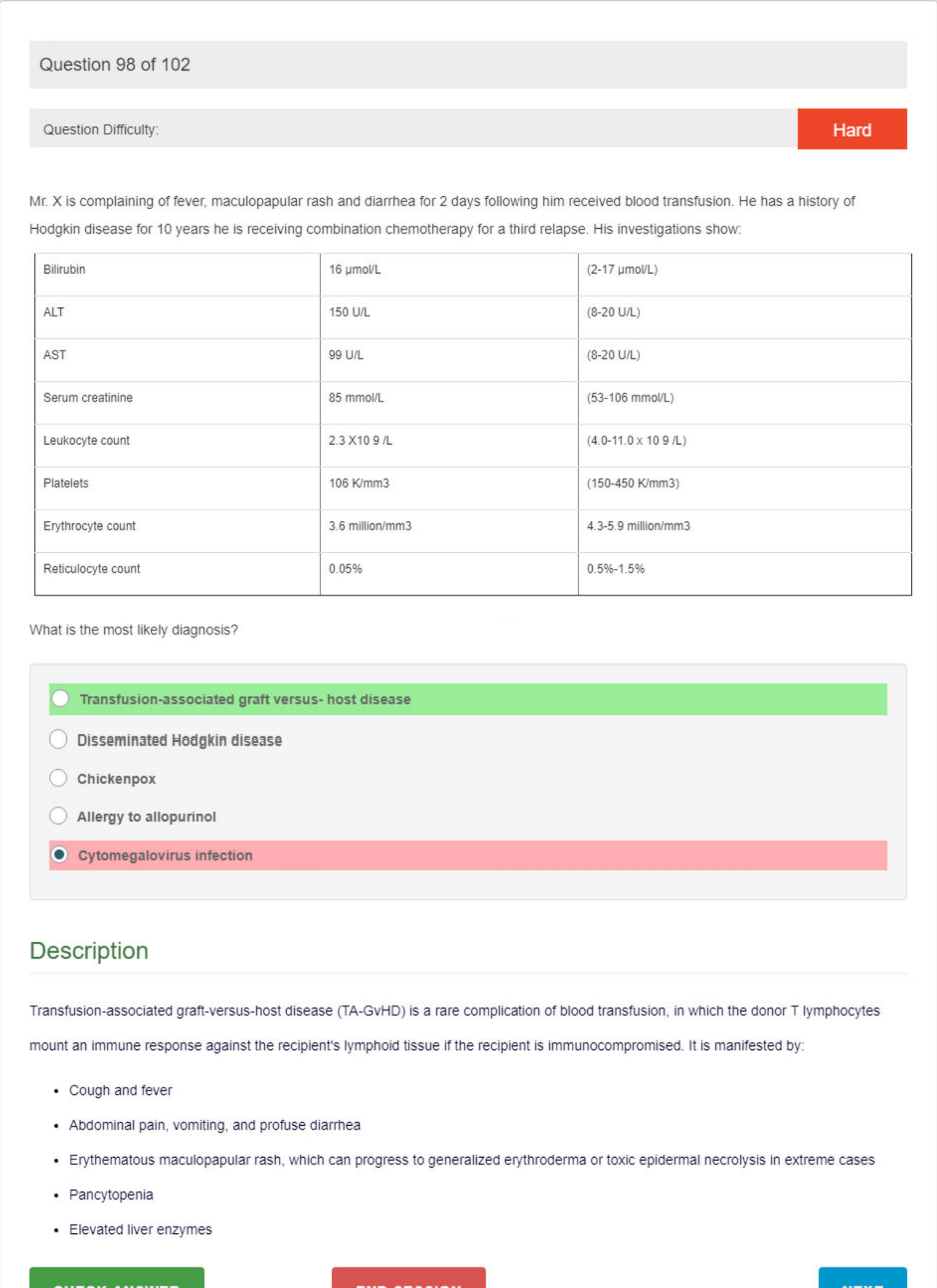
What is the most likely diagnosis?

○ **Idiopathic thrombocytopenic purpura**
○ **Drug-induced thrombocytopenia**
○ **Antiphospholipid syndrome**
○ **Henoch-Schonlein purpura**
● **Thrombotic thrombocytopenic purpura**

Description

Idiopathic thrombocytopenic purpura (ITP) is an isolated thrombocytopenia due to increased peripheral platelet destruction with normal bone marrow and in the absence of other causes of thrombocytopenia. ITP is manifested by:

- Bleeding (menorrhagia, epistaxis, gingival bleeding)
- Purpura
- Easy bruising



Question 98 of 102

Question Difficulty: **Hard**

Mr. X is complaining of fever, maculopapular rash and diarrhea for 2 days following him received blood transfusion. He has a history of Hodgkin disease for 10 years he is receiving combination chemotherapy for a third relapse. His investigations show:

Bilirubin	16 µmol/L	(2-17 µmol/L)
ALT	150 U/L	(8-20 U/L)
AST	99 U/L	(8-20 U/L)
Serum creatinine	85 mmol/L	(53-106 mmol/L)
Leukocyte count	2.3 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	106 K/mm3	(150-450 K/mm3)
Erythrocyte count	3.6 million/mm3	4.3-5.9 million/mm3
Reticulocyte count	0.05%	0.5%-1.5%

What is the most likely diagnosis?

○ **Transfusion-associated graft versus- host disease**

○ **Disseminated Hodgkin disease**

○ **Chickenpox**

○ **Allergy to allopurinol**

● **Cytomegalovirus infection**

Description

Transfusion-associated graft-versus-host disease (TA-GvHD) is a rare complication of blood transfusion, in which the donor T lymphocytes mount an immune response against the recipient's lymphoid tissue if the recipient is immunocompromised. It is manifested by:

- Cough and fever
- Abdominal pain, vomiting, and profuse diarrhea
- Erythematous maculopapular rash, which can progress to generalized erythroderma or toxic epidermal necrolysis in extreme cases
- Pancytopenia
- Elevated liver enzymes

Question 99 of 102

Question Difficulty: **Hard**

Mr. X was admitted due to deep vein thrombosis. He also recently noticed weight loss and complained of headache and visual disturbance.

Examination revealed axillary lymphadenopathy and splenomegaly. Fundoscopy shows normal retinal veins. Other investigations show:

Serum creatinine	98 mmol/L	(53-106 mmol/L)
Serum calcium	2.5 mmol/L	(2.1-2.8 mmol/L)
Leukocyte count	6.2 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	160 K/mm3	(150-450 K/mm3)
Erythrocyte count	4.2 million/mm3	4.3-5.9 million/mm3
Serum albumin	40 g/L	(35 - 50 g/L)
Serum protein	90 g/L	(60 - 76 g/L)

Which of the following investigations is diagnostic?

○ **Serum protein electrophoresis**
○ **INR**
○ **Urine protein electrophoresis**
○ **Skeletal survey**
● **PET scan**

Description

This patient is complaining of Waldenstrom macroglobulinemia. It is a chronic, indolent, lymphoproliferative disorder that is characterized by the presence of a high level of a macroglobulin (IgM) and hyperviscosity syndrome. Other manifestations include:

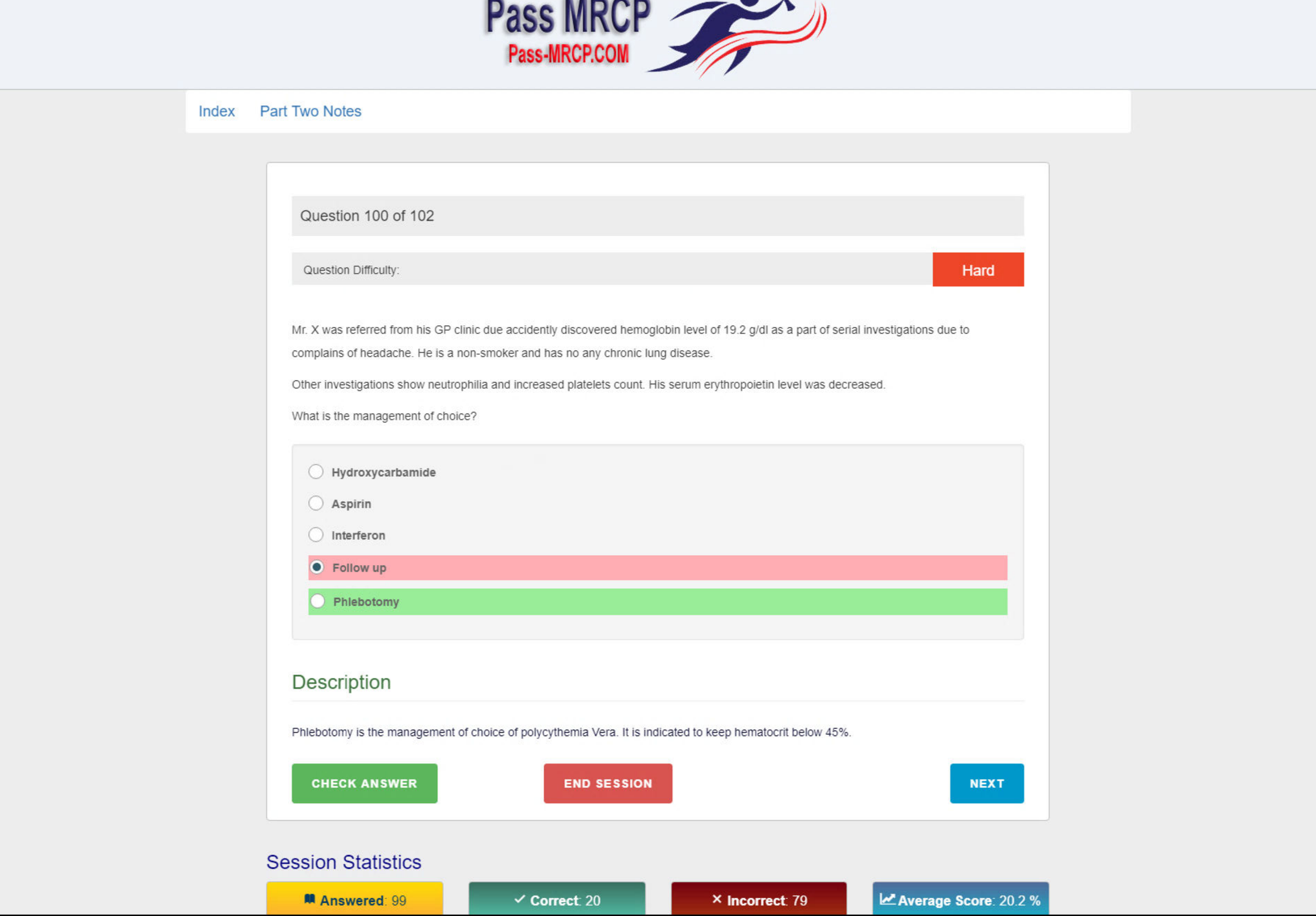
- Diarrhea and malabsorption secondary to gastrointestinal involvement
- Renal failure
- Amyloidosis of the heart, kidney, liver, lungs, and joints
- Bleeding manifestations secondary to platelet dysfunction and coagulation factor and fibrinogen abnormalities
- Raynaud phenomenon secondary to cryoglobulinemia
- Recurrent infection due to B-cell dysfunction
- Lymph node enlargement
- Hepato-splenomegaly

Serum protein electrophoresis shows IgM paraproteinemia. Bone marrow aspiration and biopsy is diagnostic; it shows infiltration by small lymphocytes showing plasmacytic differentiation.

CHECK ANSWER END SESSION NEXT

Session Statistics

Answered: 98 ✓ **Correct**: 20 × **Incorrect**: 78 **Average Score**: 20.41 %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Part Two Notes

Question 100 of 102

Question Difficulty: **Hard**

Mr. X was referred from his GP clinic due accidently discovered hemoglobin level of 19.2 g/dl as a part of serial investigations due to complains of headache. He is a non-smoker and has no any chronic lung disease.

Other investigations show neutrophilia and increased platelets count. His serum erythropoietin level was decreased.

What is the management of choice?

○ **Hydroxycarbamide**
○ **Aspirin**
○ **Interferon**
● **Follow up**
○ **Phlebotomy**

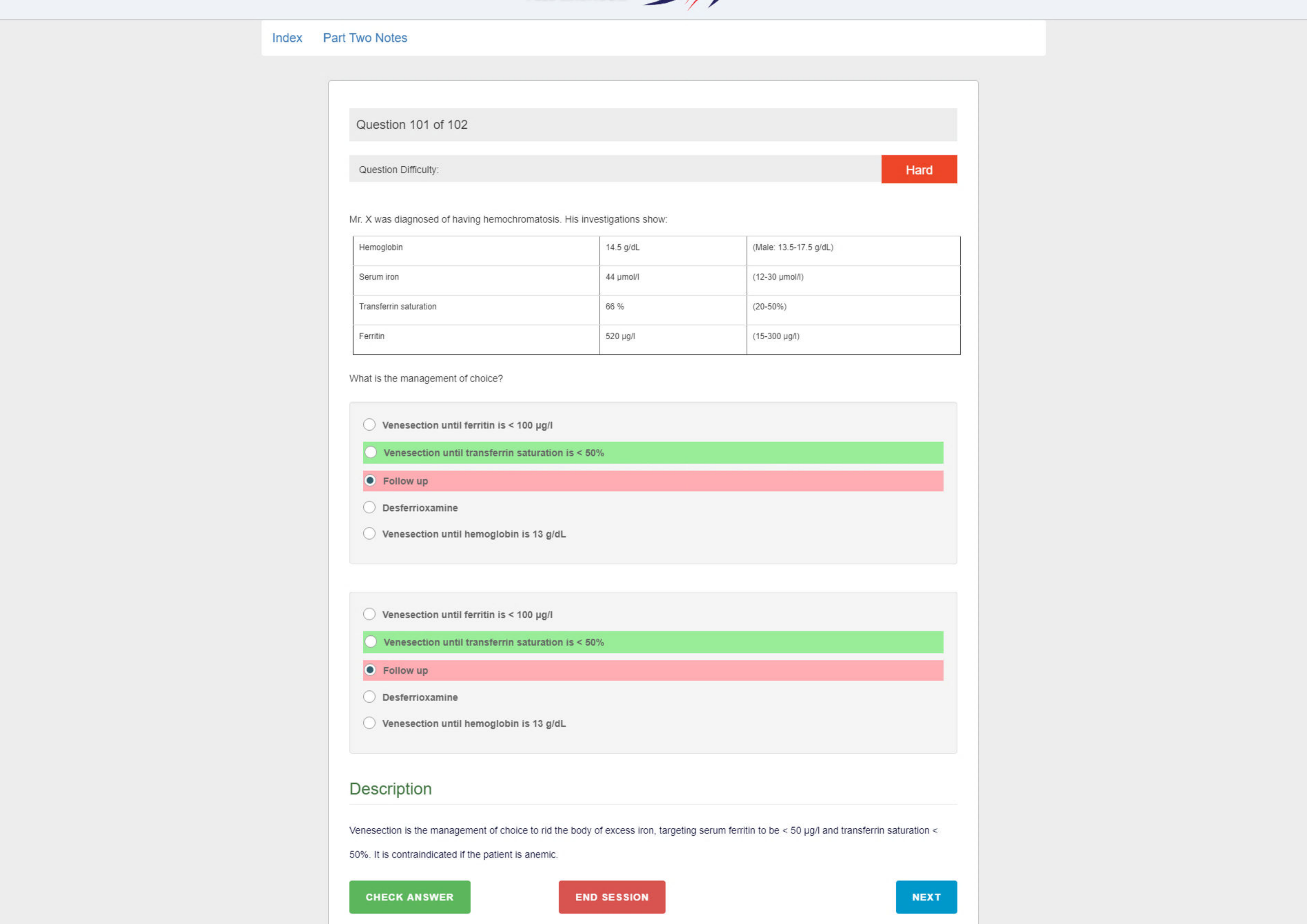
Description

Phlebotomy is the management of choice of polycythemia Vera. It is indicated to keep hematocrit below 45%.

CHECK ANSWER
END SESSION
NEXT

Session Statistics

Answered: 99
✓ **Correct**: 20
✕ **Incorrect**: 79
Average Score: 20.2 %



Question 101 of 102

Question Difficulty: Hard

Mr. X was diagnosed of having hemochromatosis. His investigations show:

Hemoglobin	14.5 g/dL	(Male: 13.5-17.5 g/dL)
Serum iron	44 µmol/l	(12-30 µmol/l)
Transferrin saturation	66 %	(20-50%)
Ferritin	520 µg/l	(15-300 µg/l)

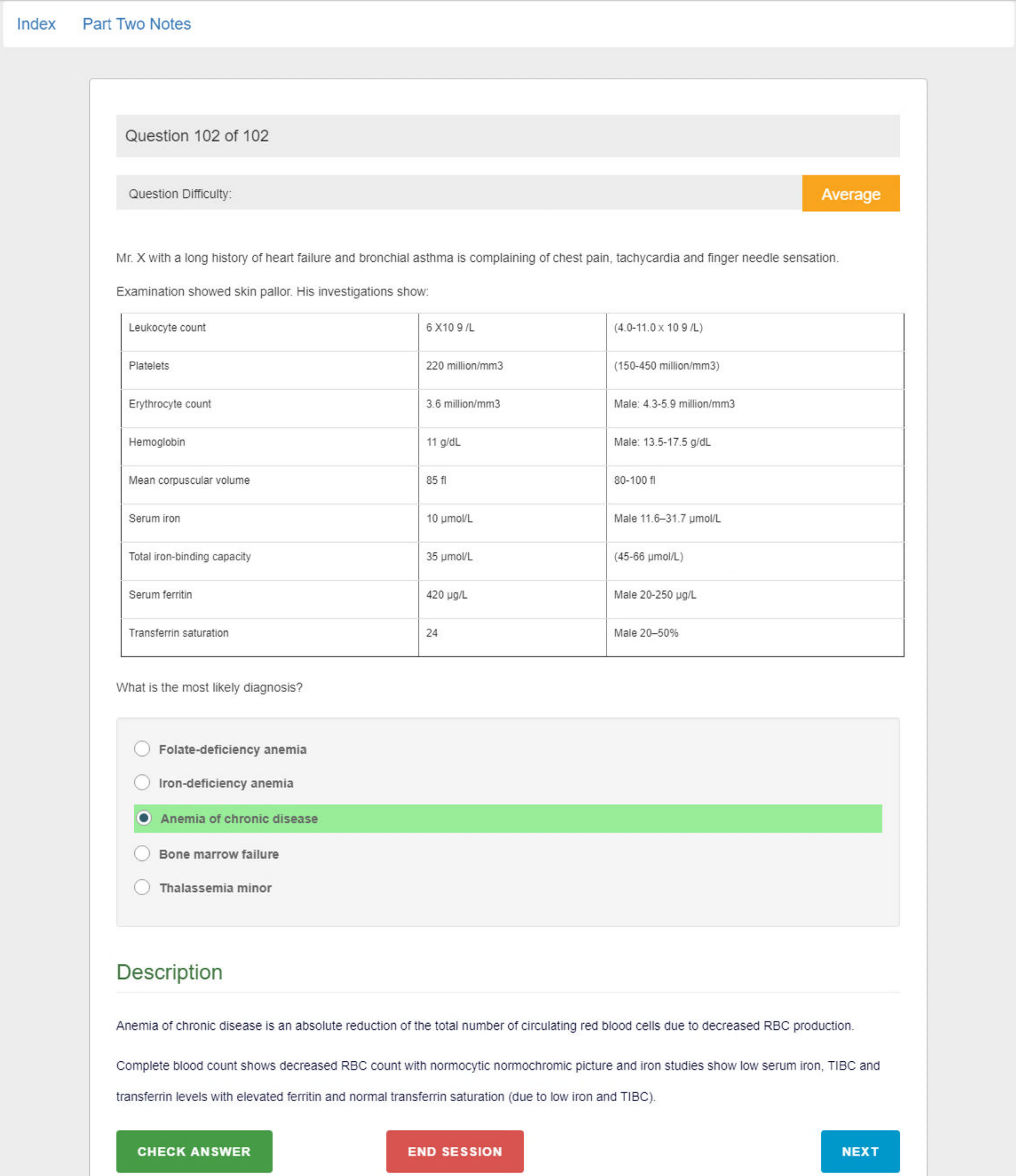
What is the management of choice?

- ○ **Venesection until ferritin is < 100 µg/l**
- ○ **Venesection until transferrin saturation is < 50%**
- ● **Follow up**
- ○ **Desferrioxamine**
- ○ **Venesection until hemoglobin is 13 g/dL**

- ○ **Venesection until ferritin is < 100 µg/l**
- ○ **Venesection until transferrin saturation is < 50%**
- ● **Follow up**
- ○ **Desferrioxamine**
- ○ **Venesection until hemoglobin is 13 g/dL**

Description

Venesection is the management of choice to rid the body of excess iron, targeting serum ferritin to be < 50 µg/l and transferrin saturation < 50%. It is contraindicated if the patient is anemic.



Question 102 of 102

Question Difficulty: **Average**

Mr. X with a long history of heart failure and bronchial asthma is complaining of chest pain, tachycardia and finger needle sensation.

Examination showed skin pallor. His investigations show:

Leukocyte count	6 X10 9 /L	(4.0-11.0 x 10 9 /L)
Platelets	220 million/mm3	(150-450 million/mm3)
Erythrocyte count	3.6 million/mm3	Male: 4.3-5.9 million/mm3
Hemoglobin	11 g/dL	Male: 13.5-17.5 g/dL
Mean corpuscular volume	85 fl	80-100 fl
Serum iron	10 µmol/L	Male 11.6–31.7 µmol/L
Total iron-binding capacity	35 µmol/L	(45-66 µmol/L)
Serum ferritin	420 µg/L	Male 20-250 µg/L
Transferrin saturation	24	Male 20–50%

What is the most likely diagnosis?

- ○ **Folate-deficiency anemia**
- ○ **Iron-deficiency anemia**
- ● **Anemia of chronic disease**
- ○ **Bone marrow failure**
- ○ **Thalassemia minor**

Description

Anemia of chronic disease is an absolute reduction of the total number of circulating red blood cells due to decreased RBC production.

Complete blood count shows decreased RBC count with normocytic normochromic picture and iron studies show low serum iron, TIBC and transferrin levels with elevated ferritin and normal transferrin saturation (due to low iron and TIBC).